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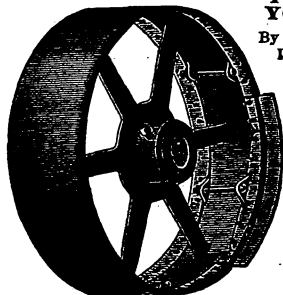
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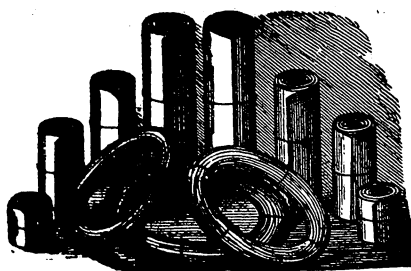
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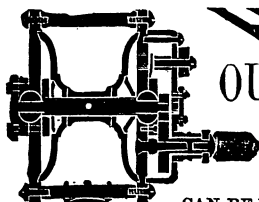
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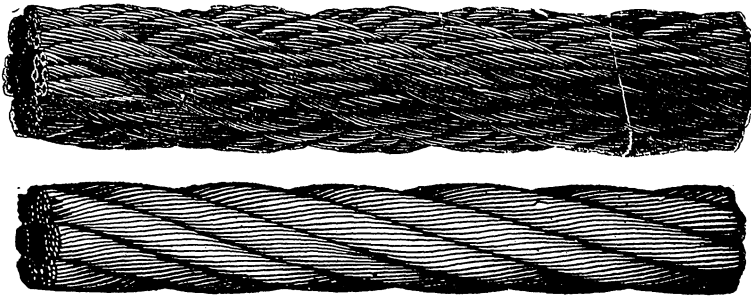
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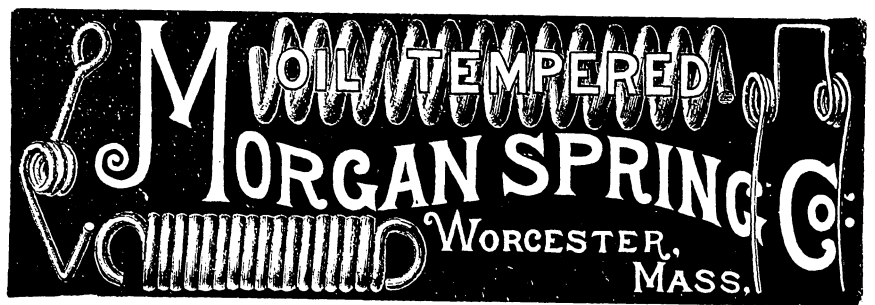
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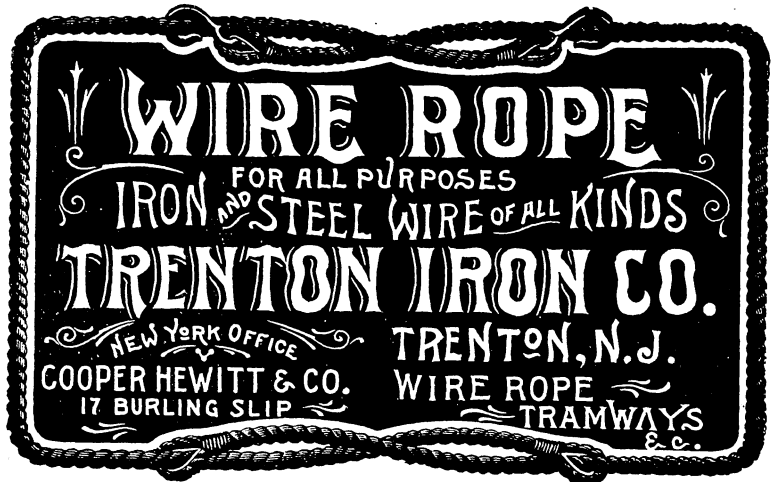
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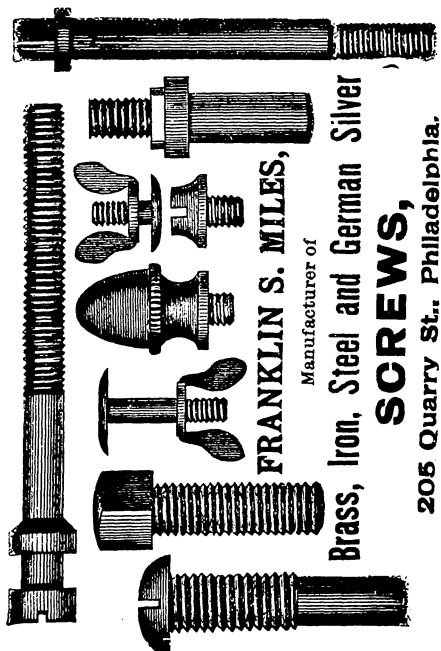
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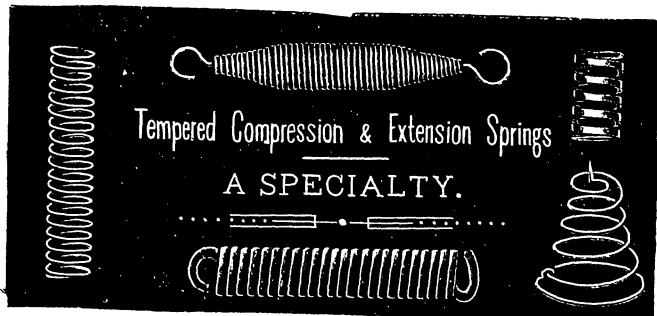
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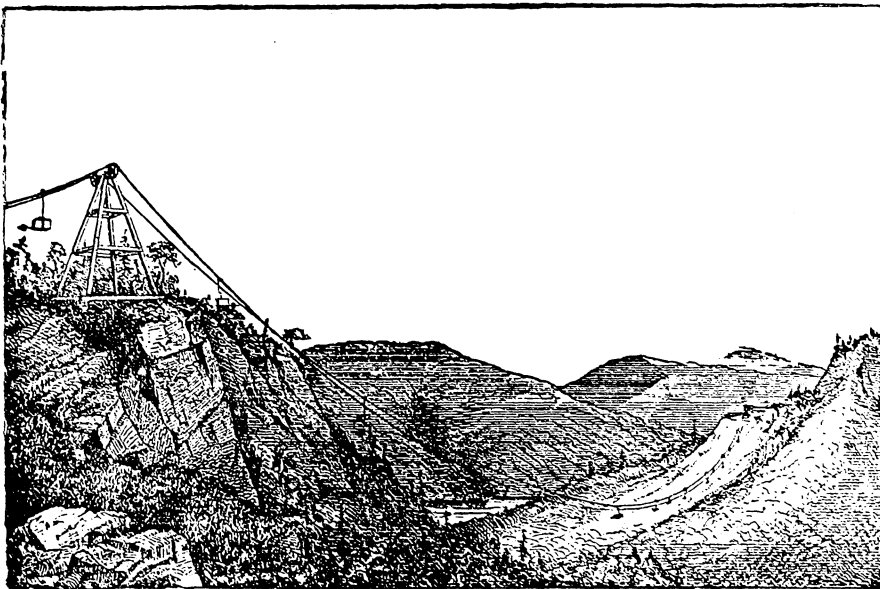
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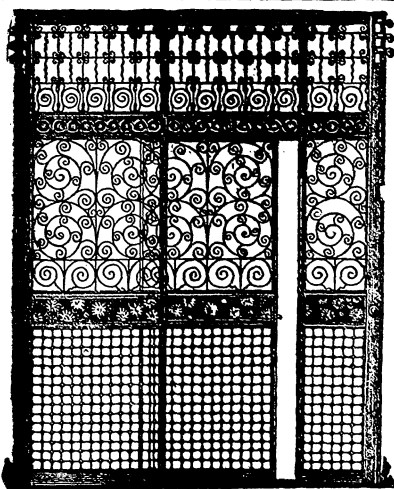
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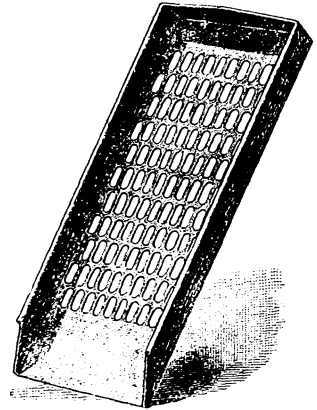


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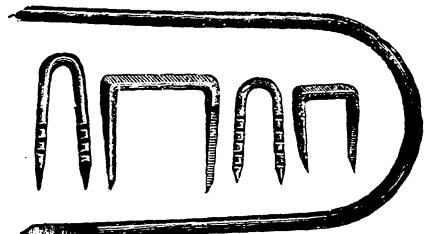
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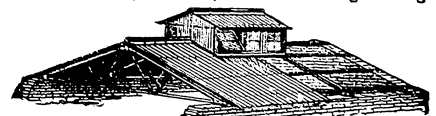
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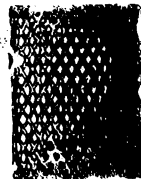


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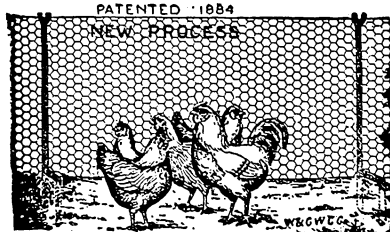
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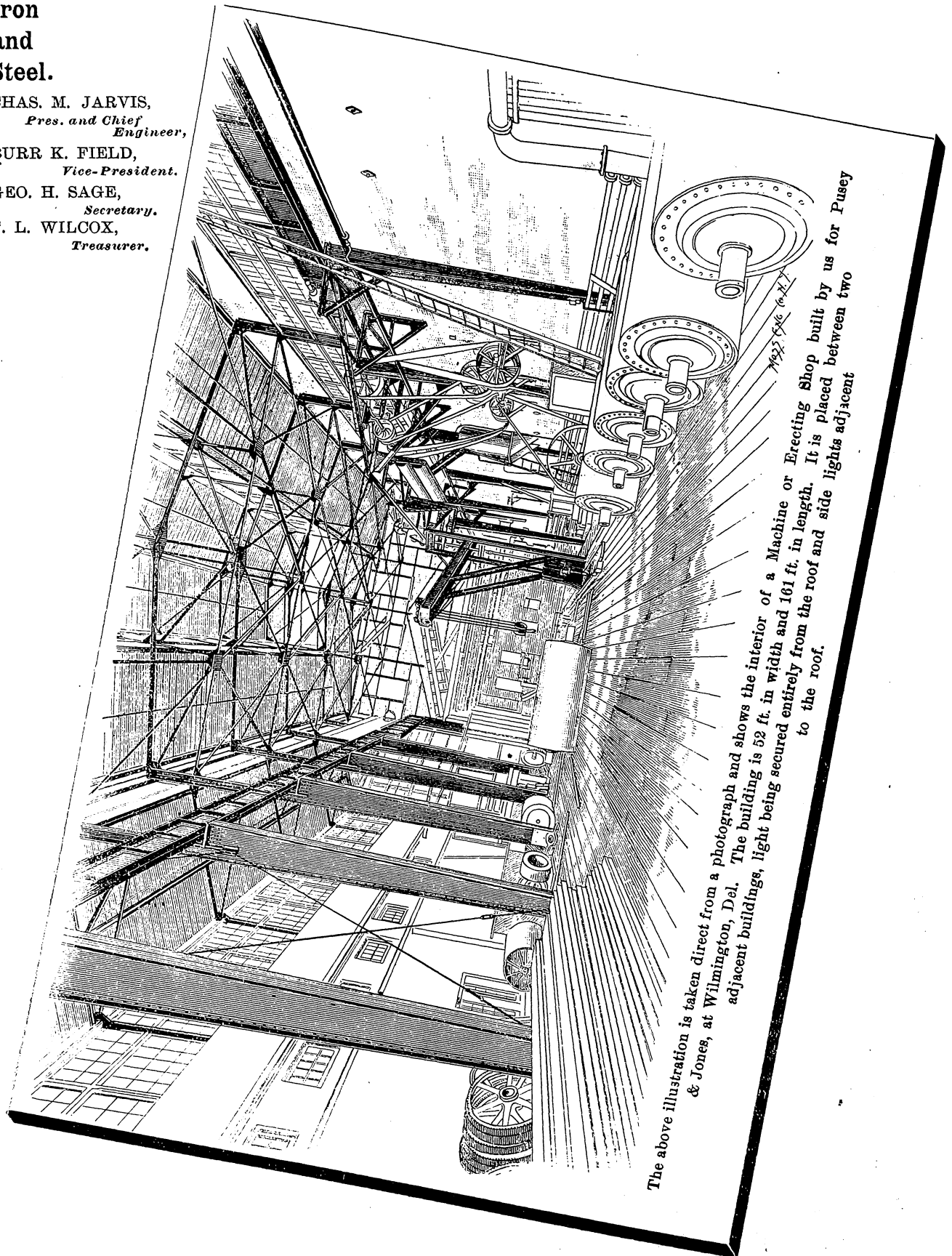
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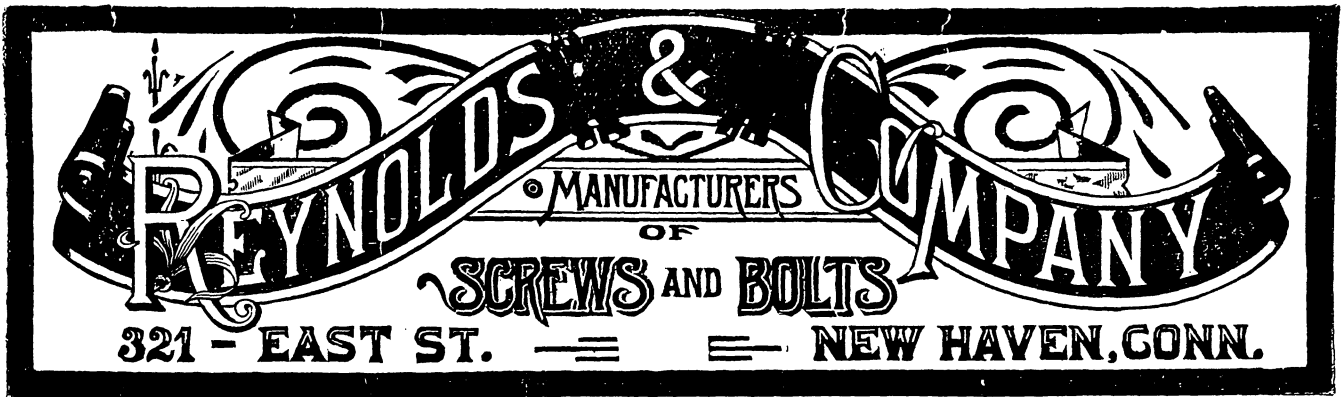
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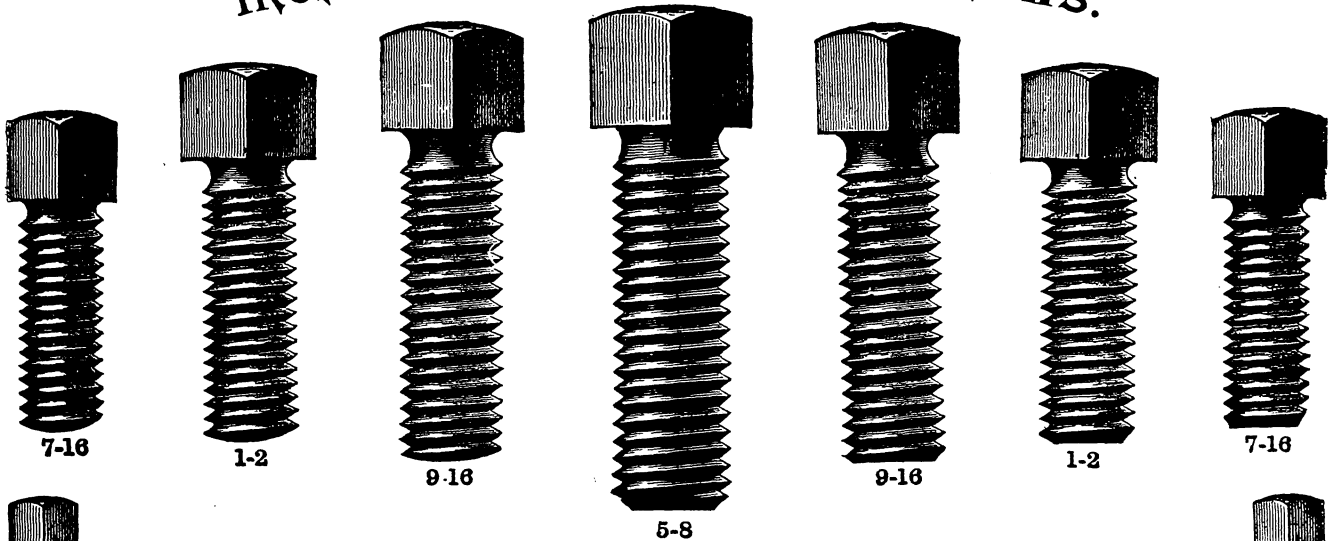


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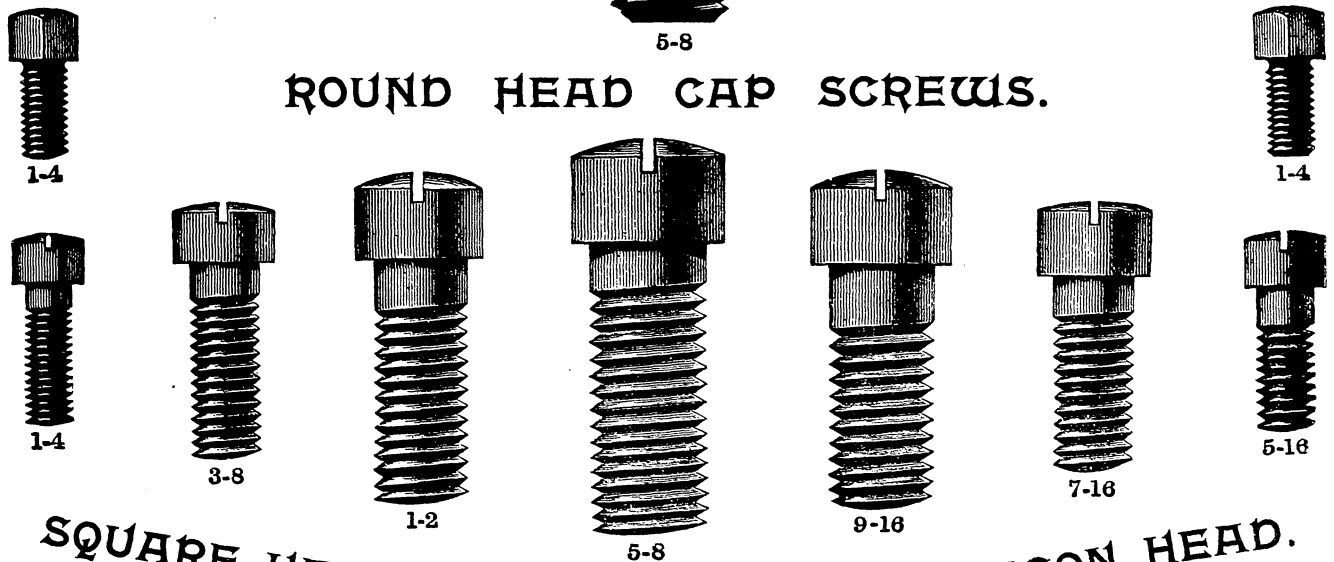
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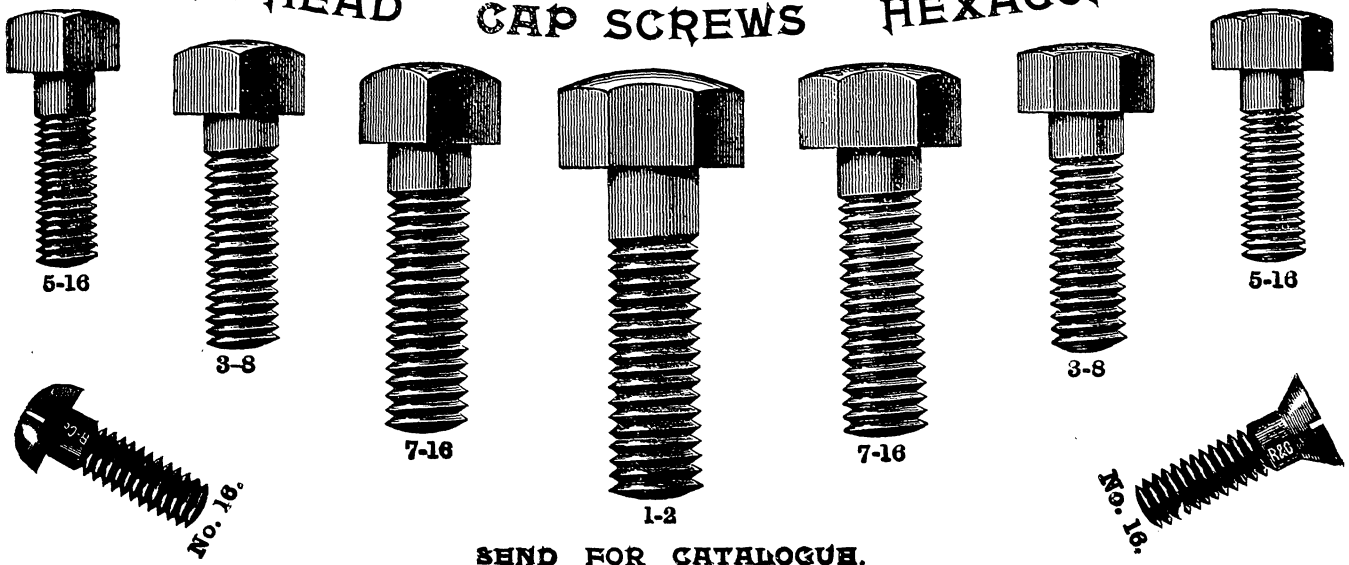
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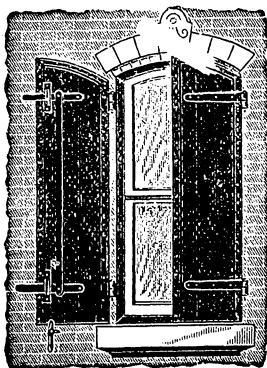
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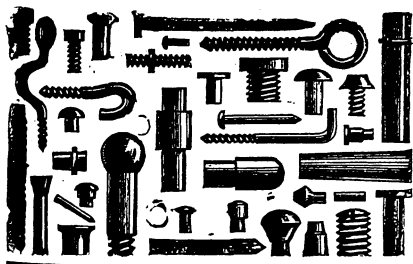
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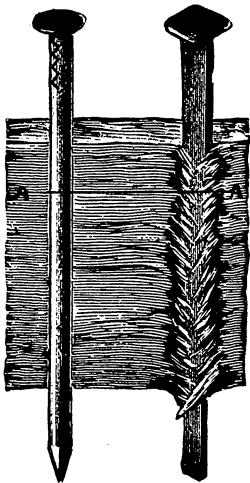
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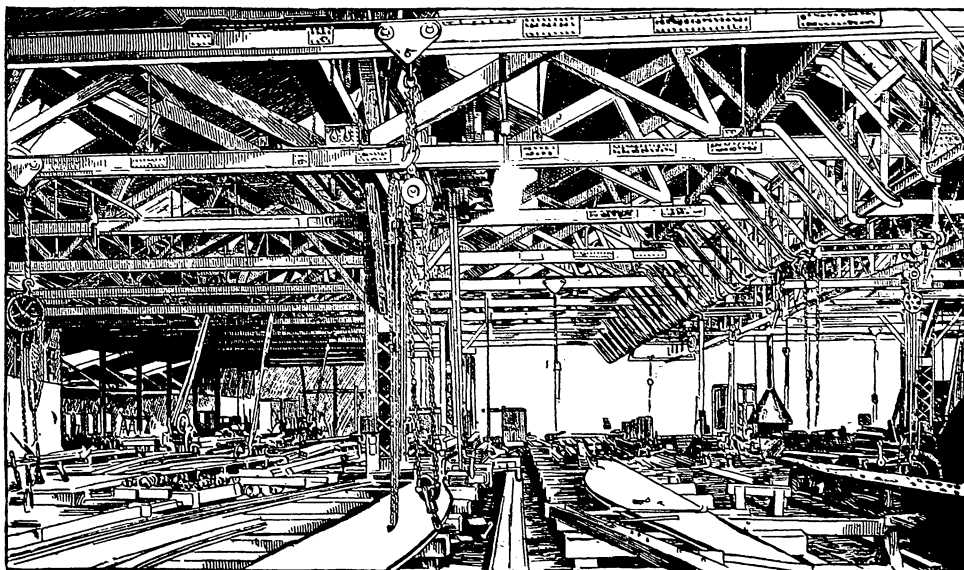
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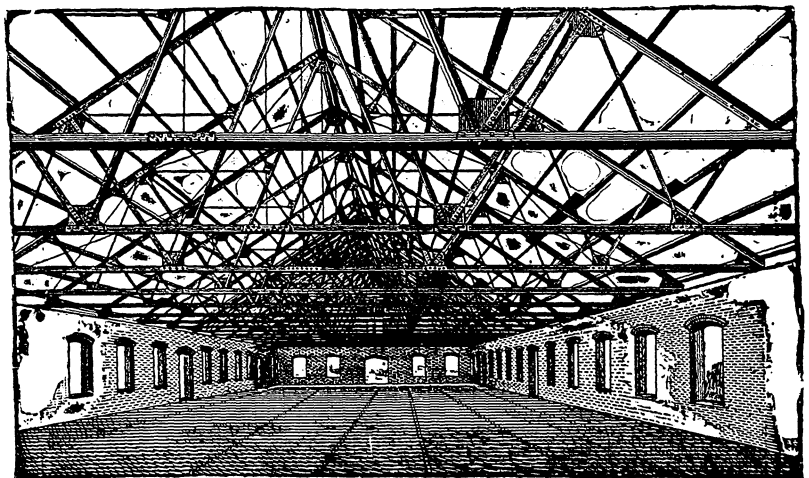
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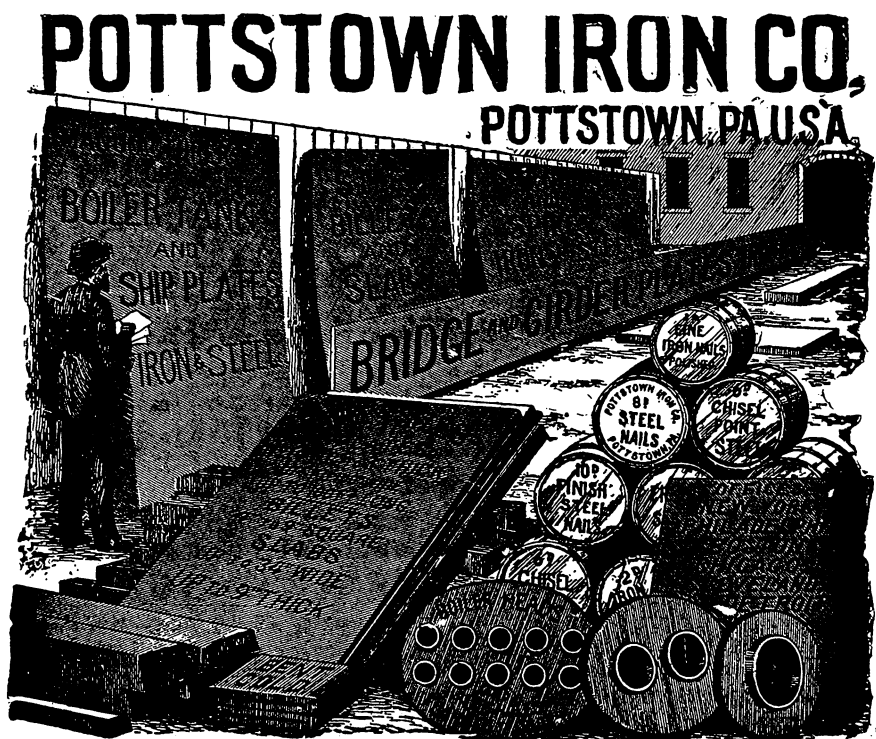
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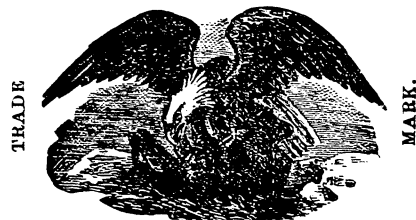
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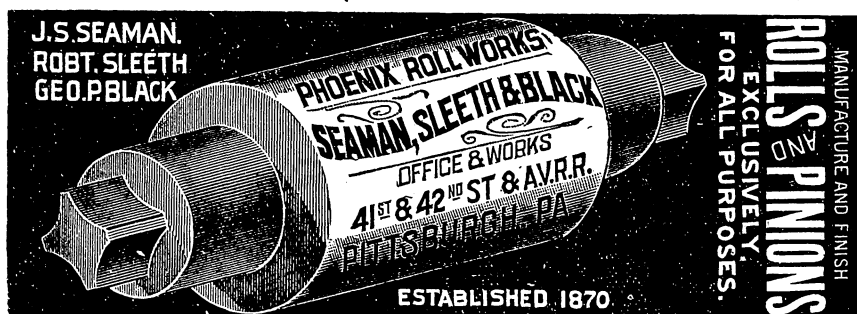
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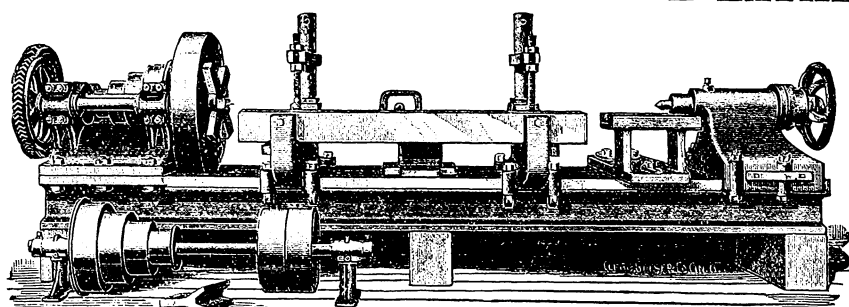
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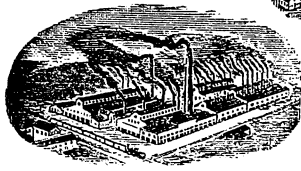
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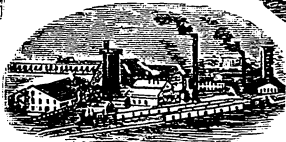
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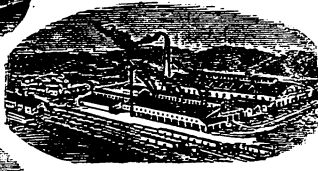
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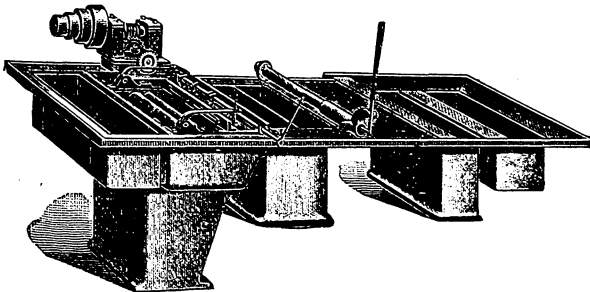
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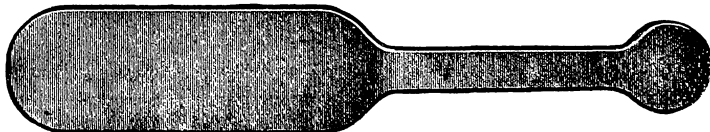
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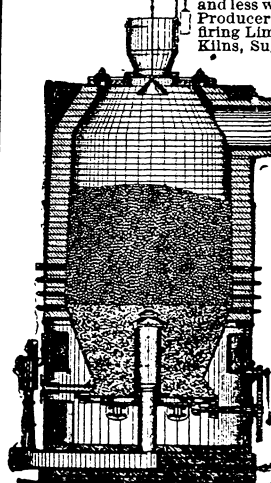
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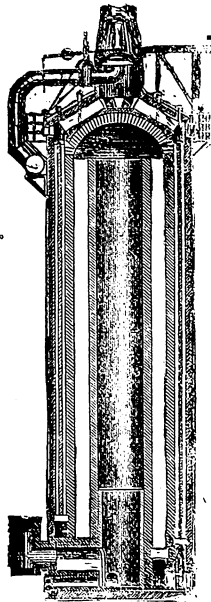
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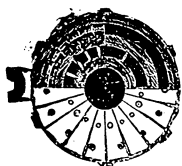
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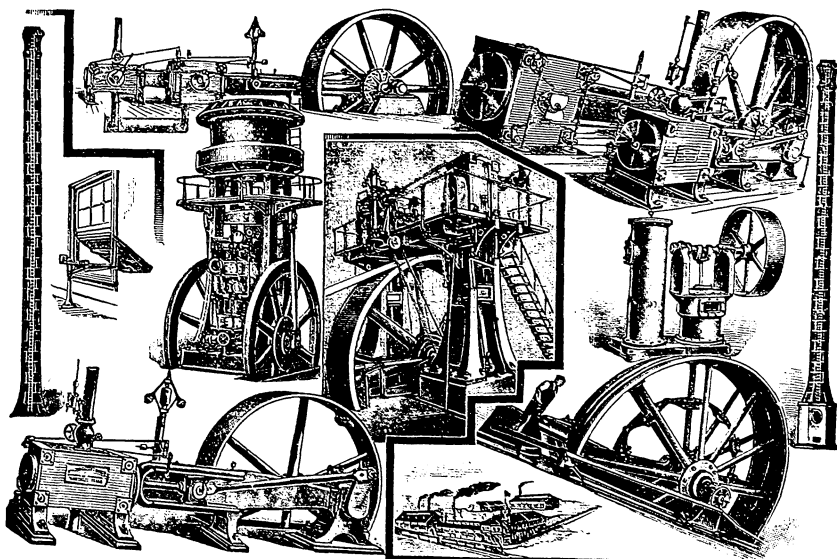
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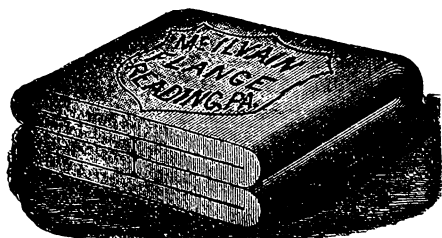
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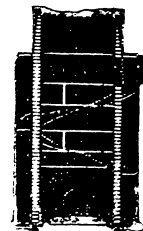
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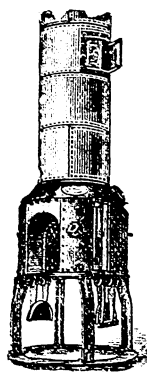
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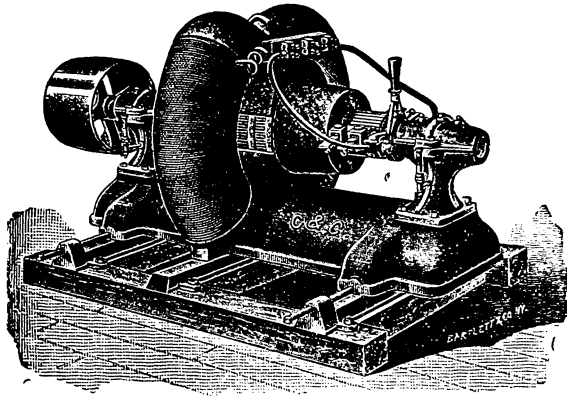
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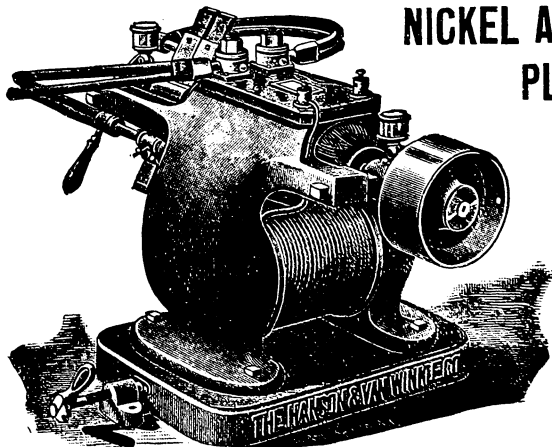
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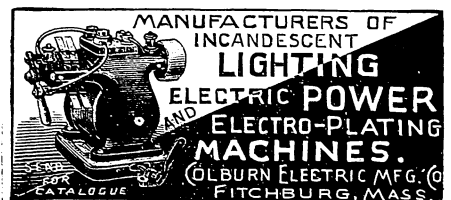
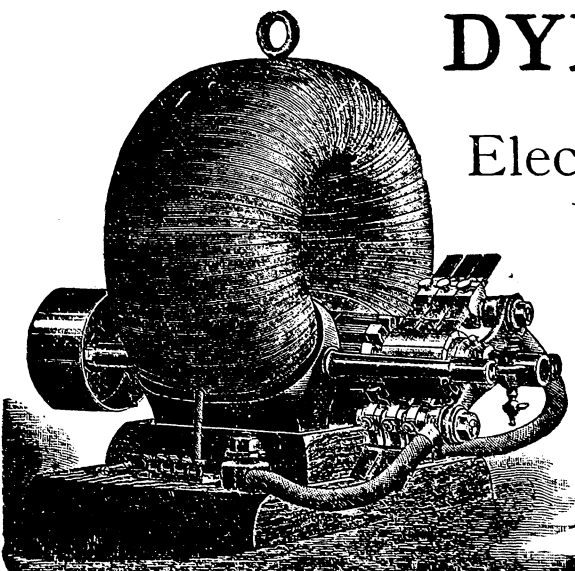
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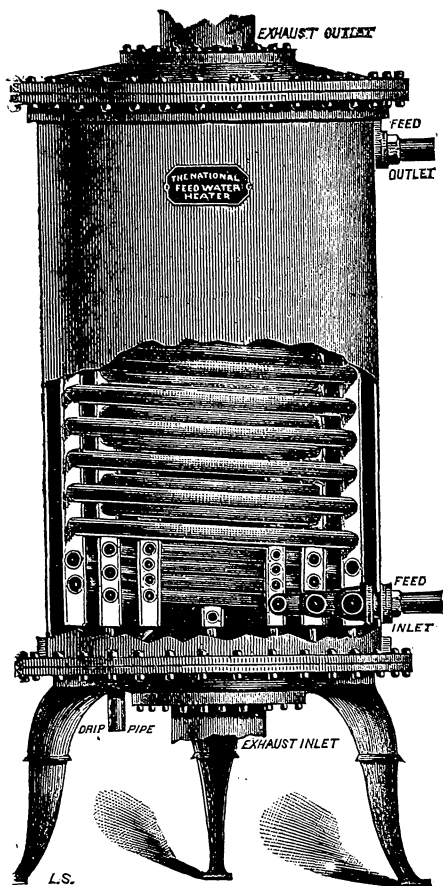
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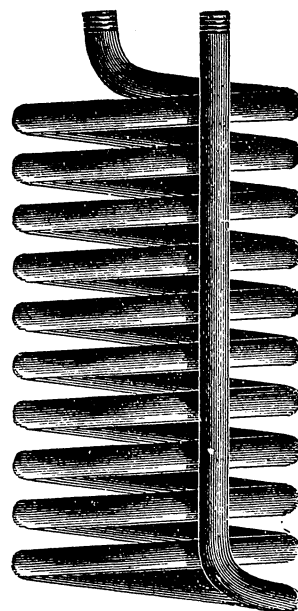
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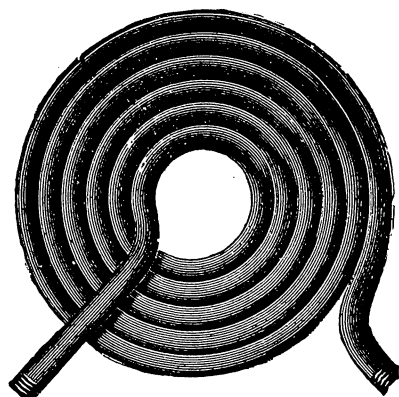
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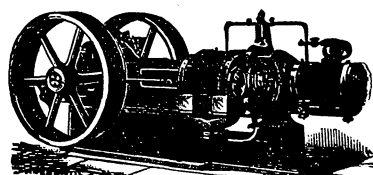
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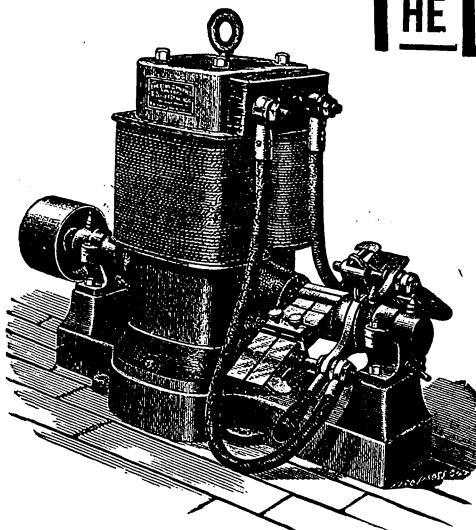
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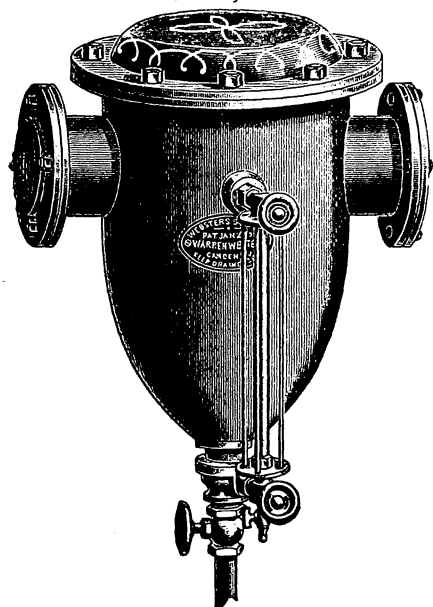


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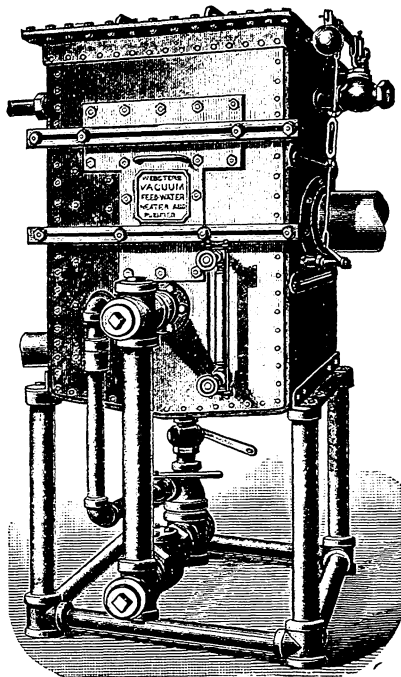
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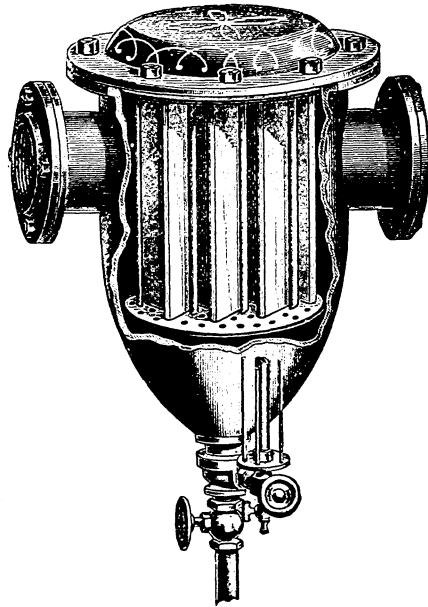
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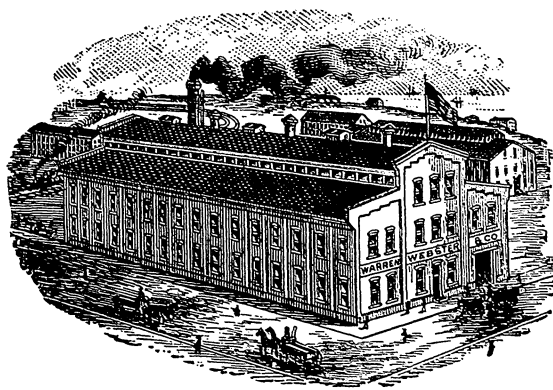
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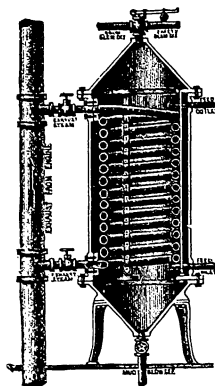
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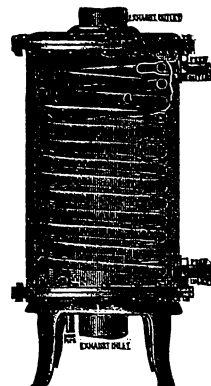
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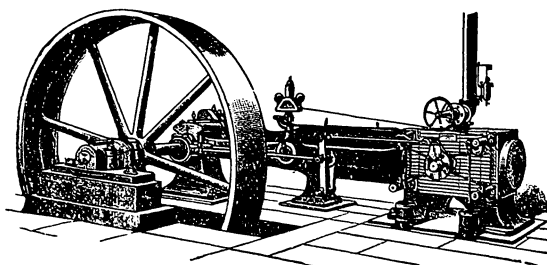
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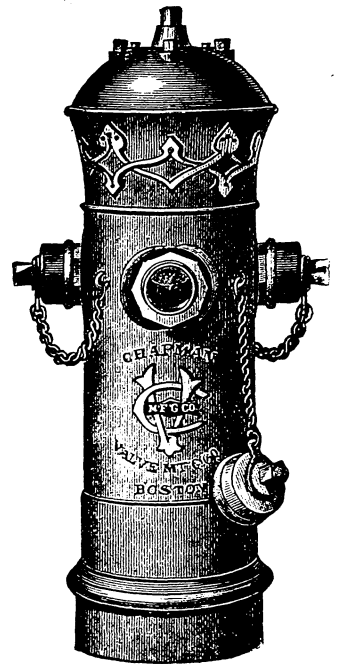
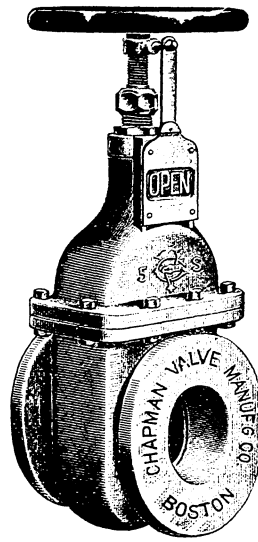
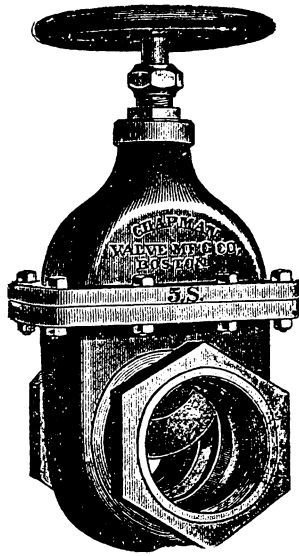
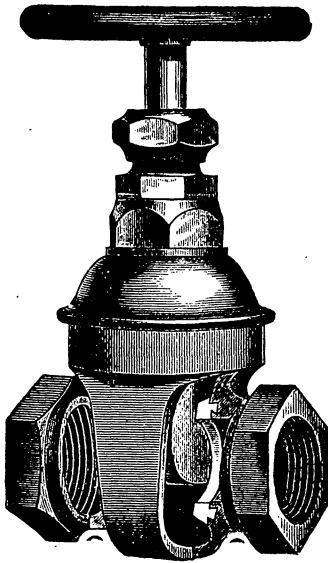
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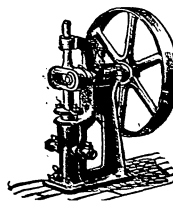
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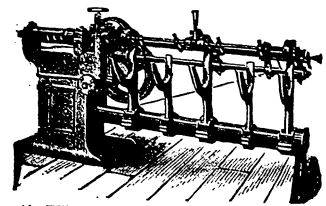
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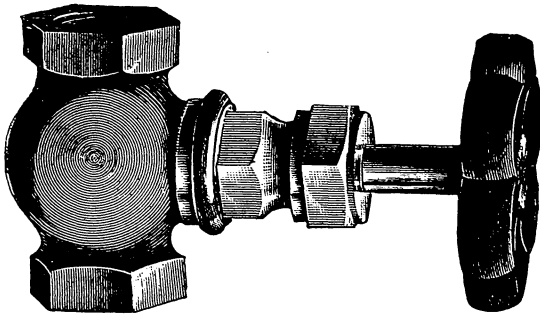


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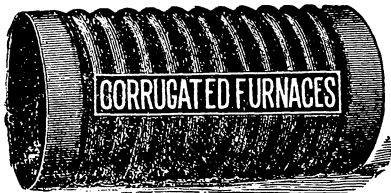
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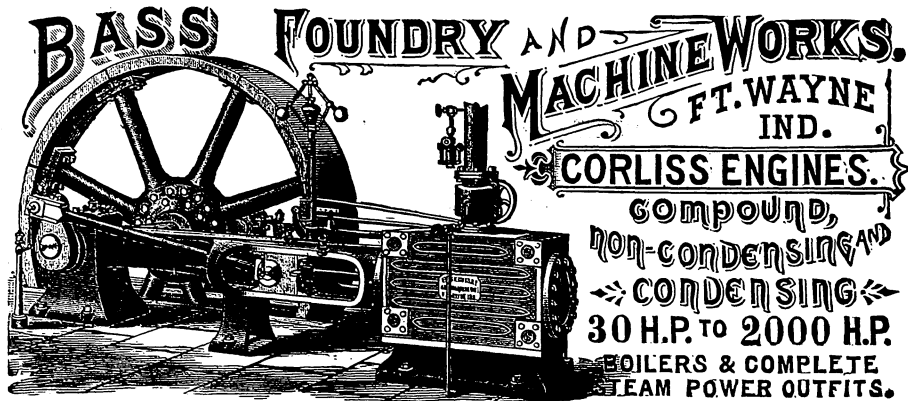
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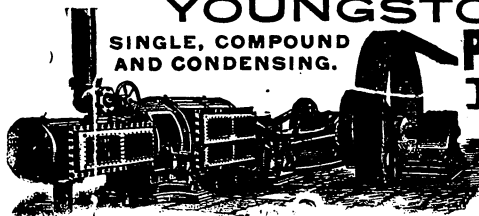


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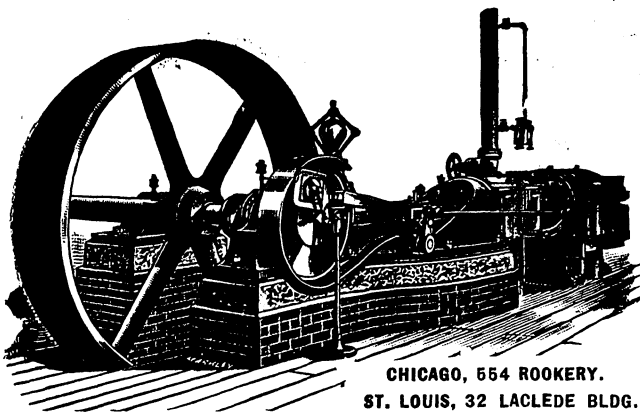
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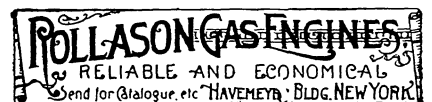
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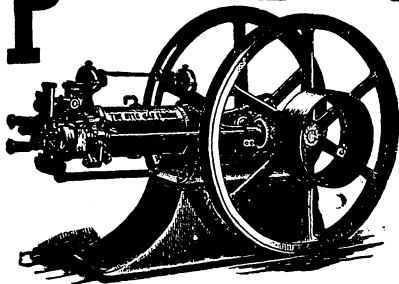
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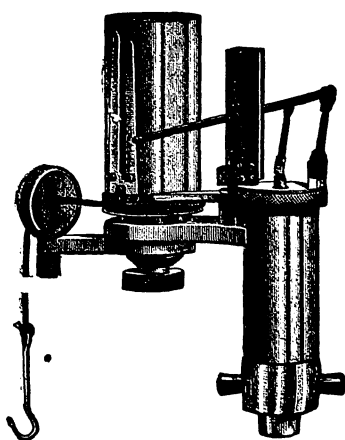
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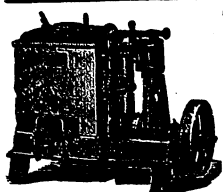
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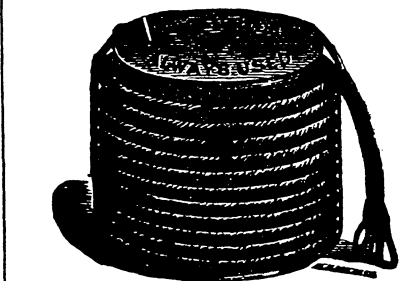
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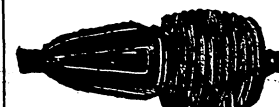
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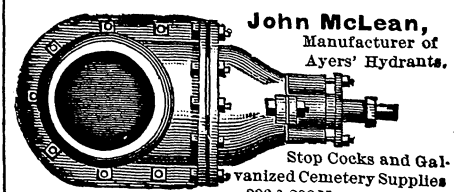
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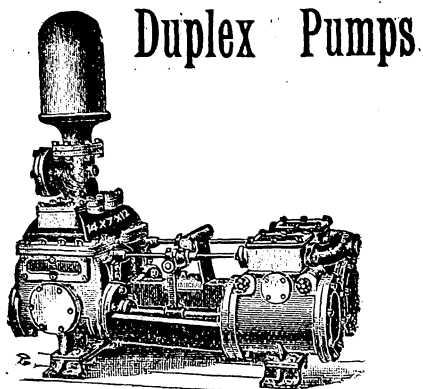
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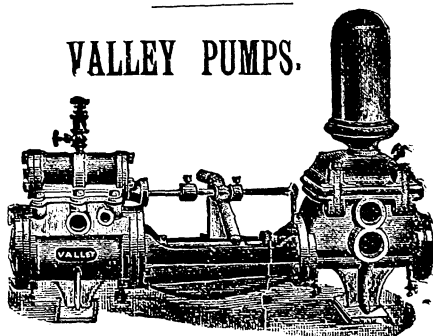


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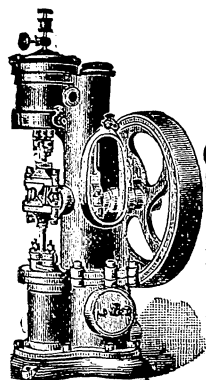
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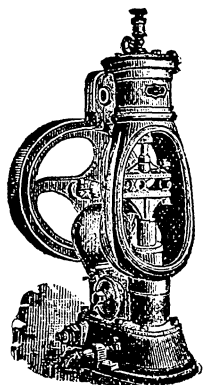
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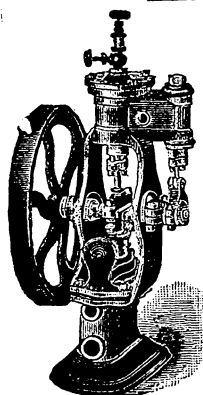
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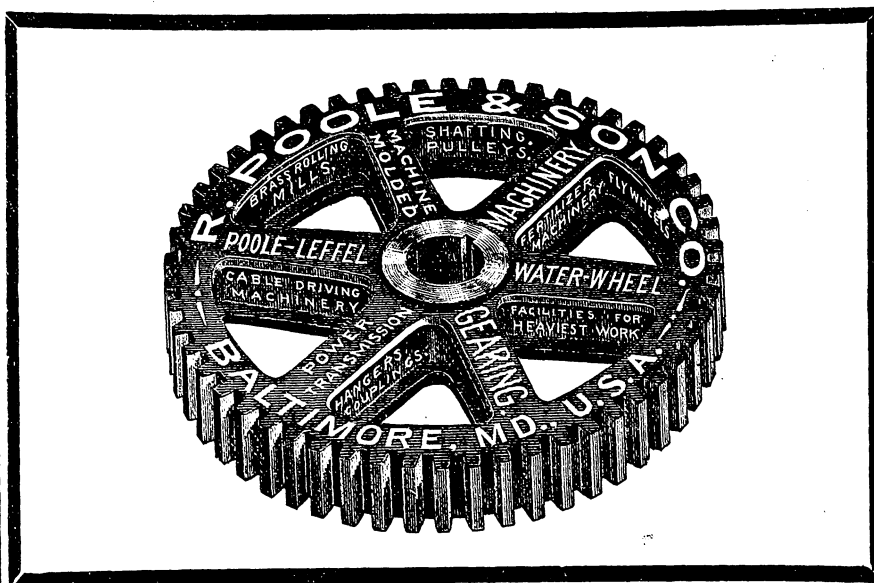
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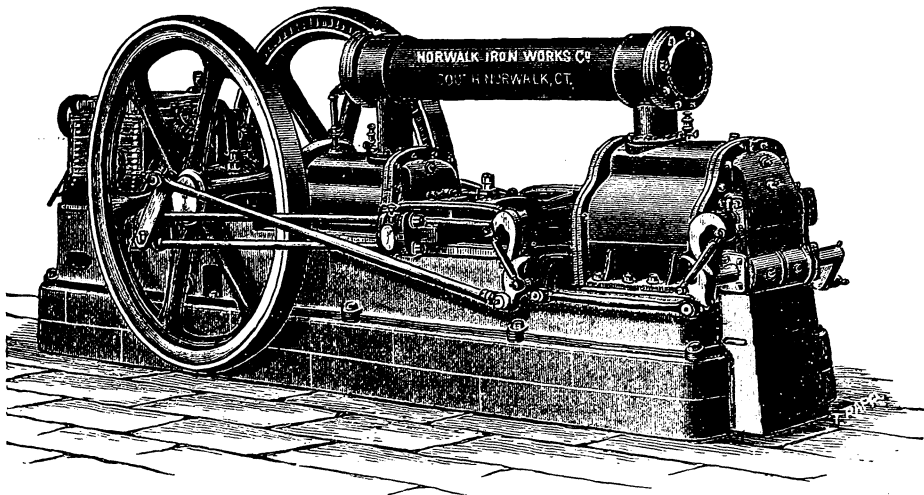
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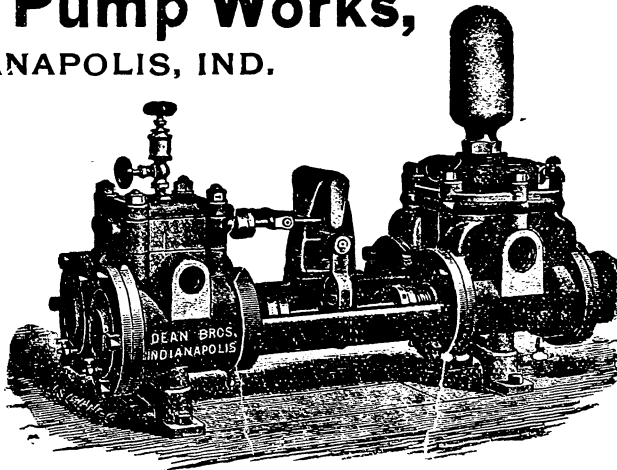
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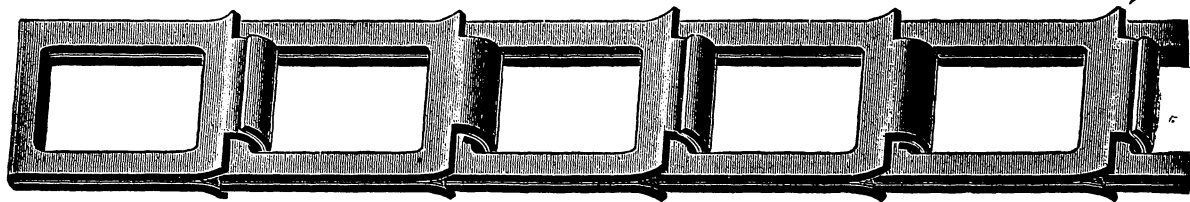
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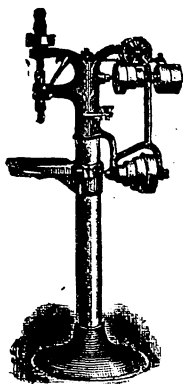
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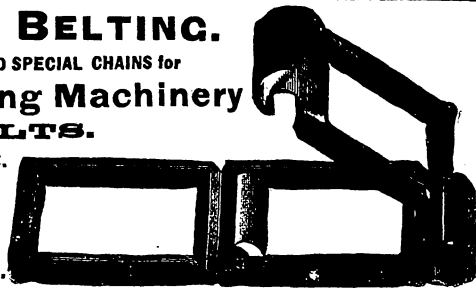
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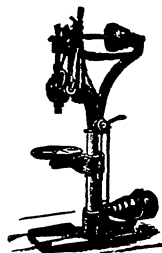
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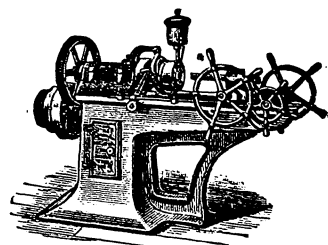
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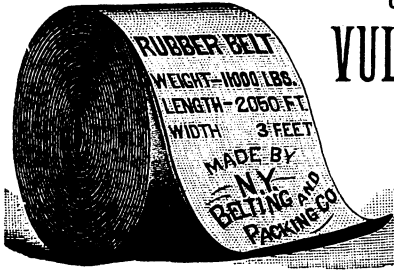
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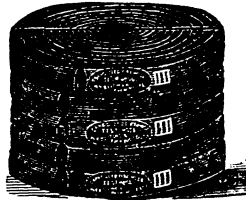
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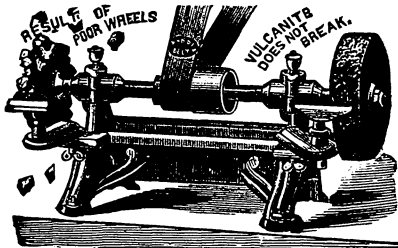
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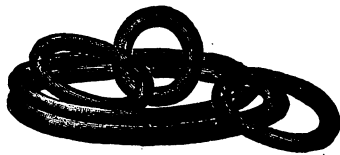
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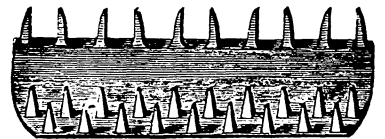
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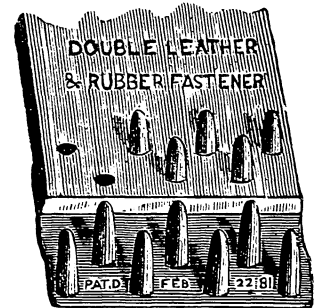
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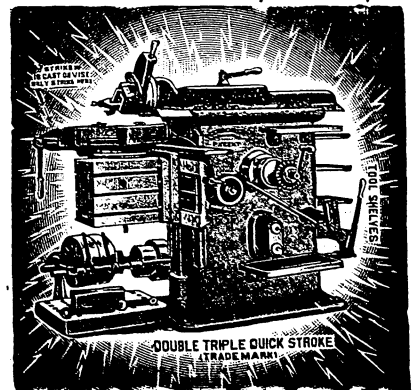


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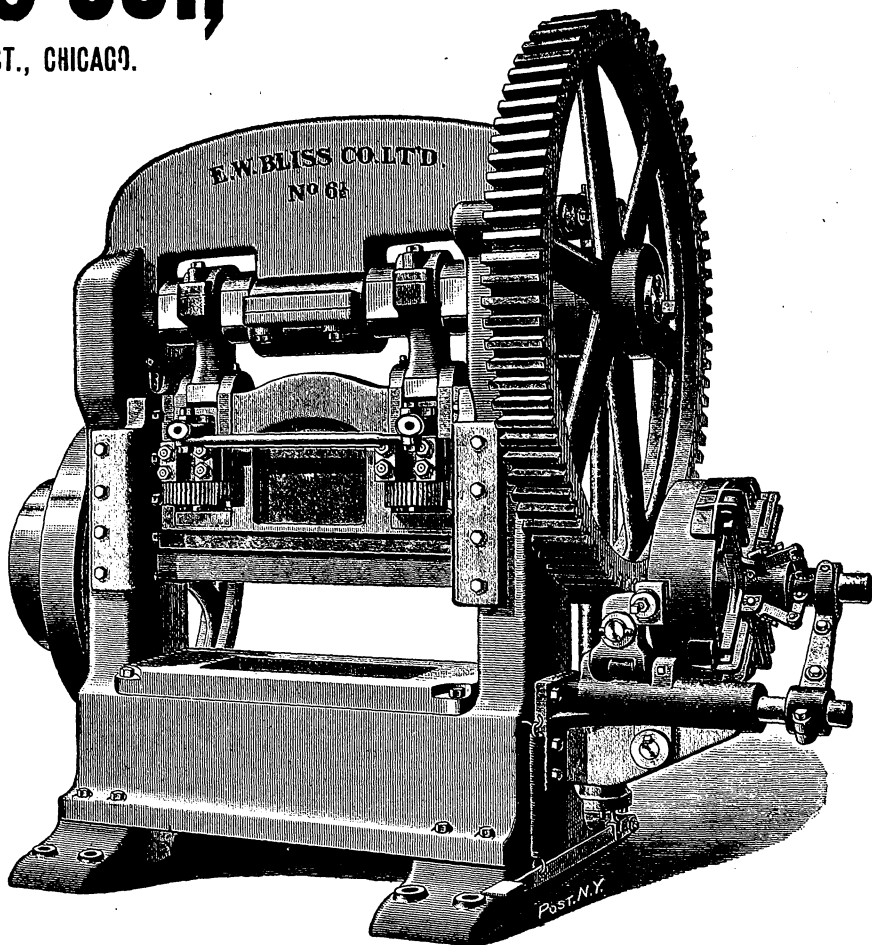
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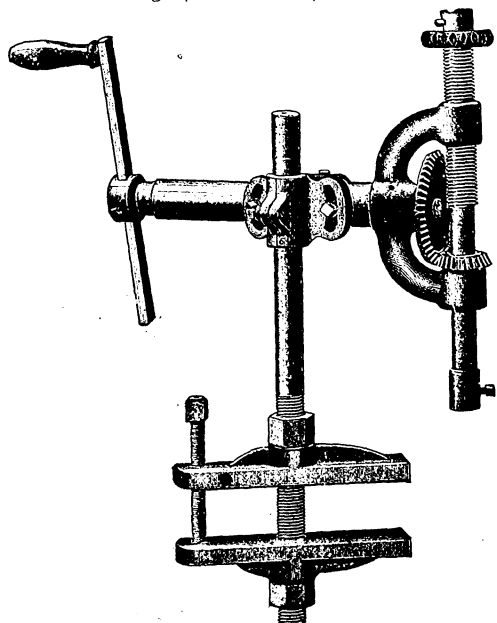
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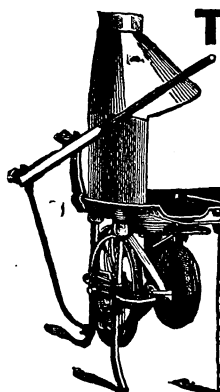
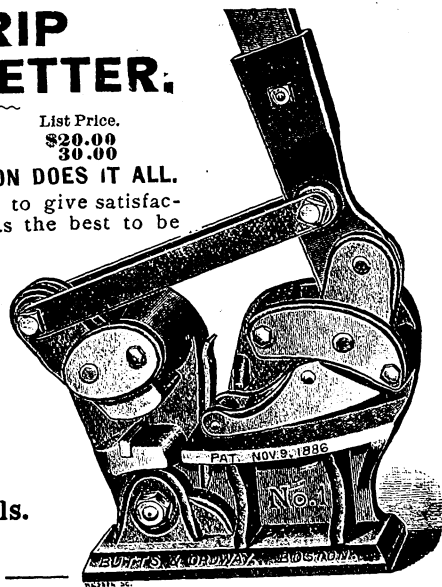
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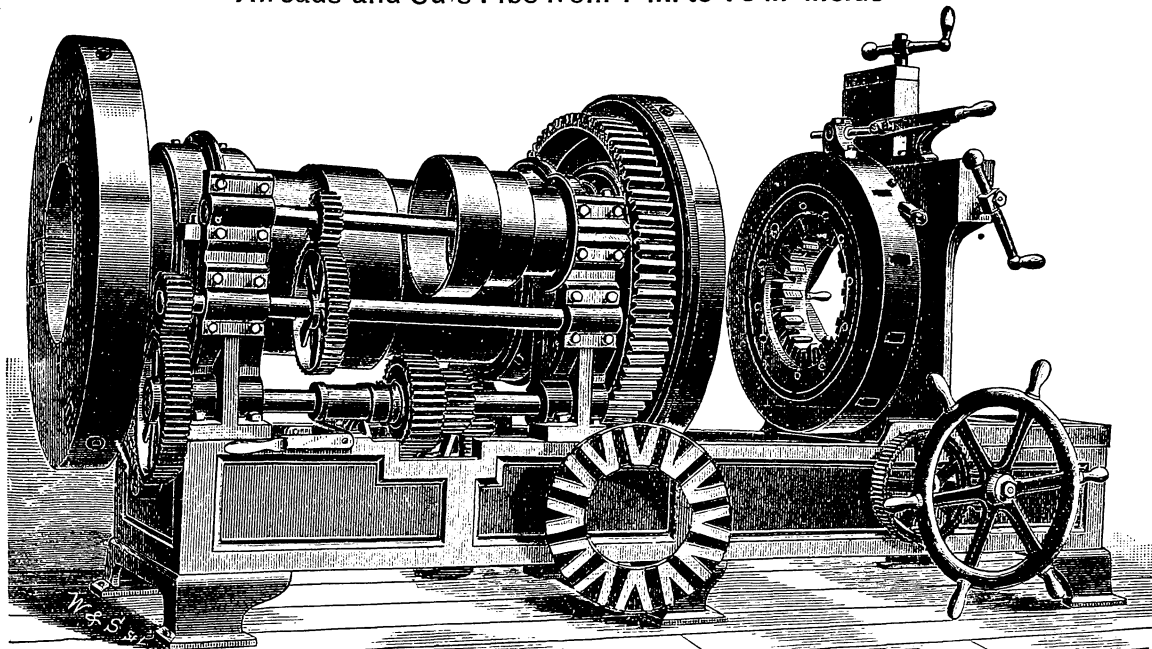


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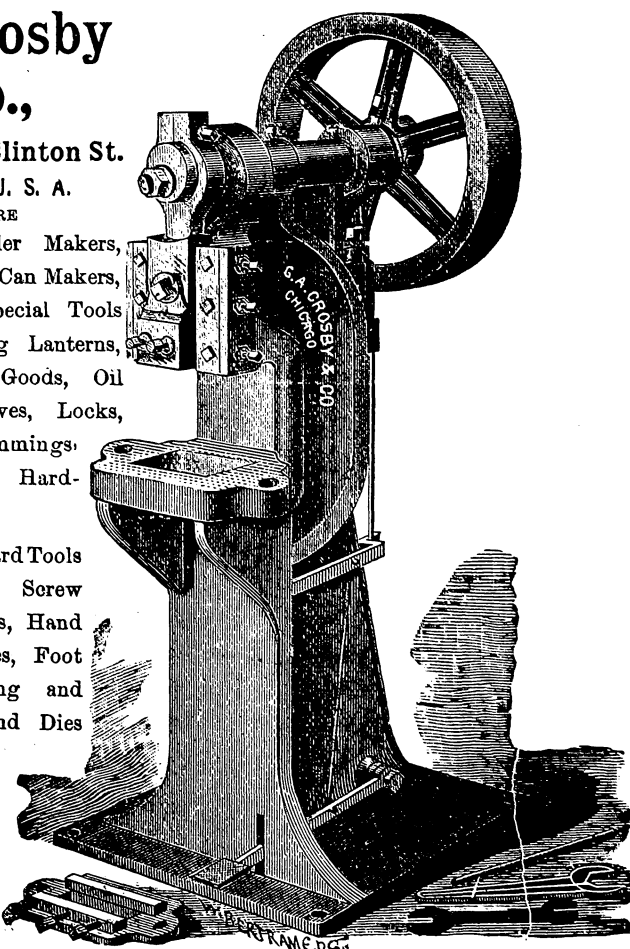
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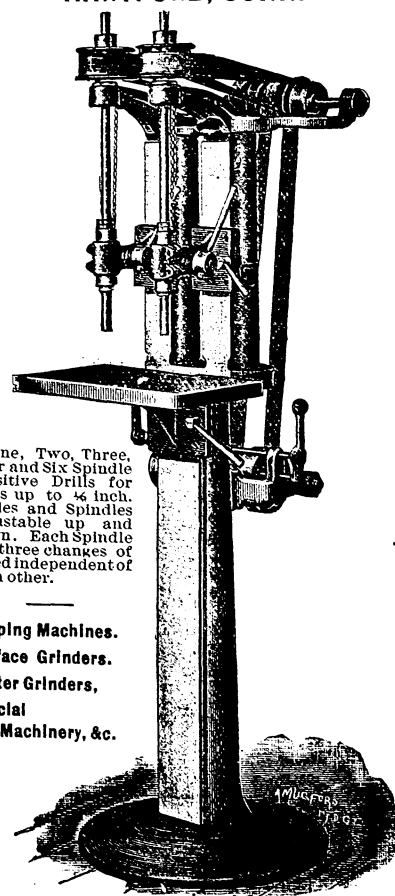
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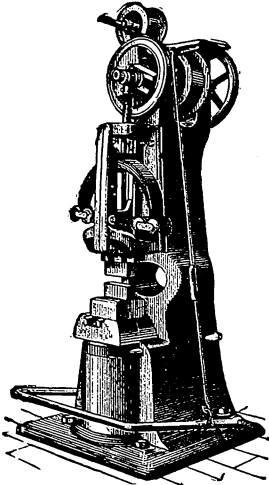
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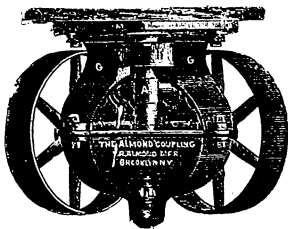
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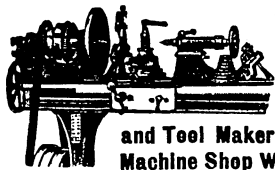


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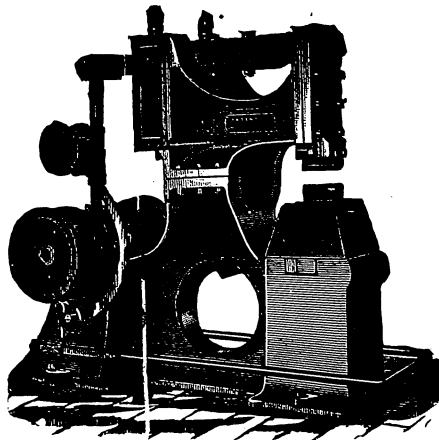
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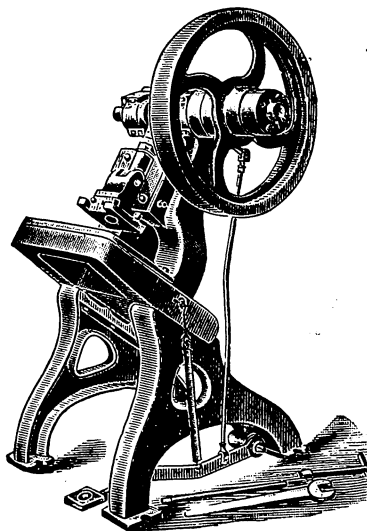
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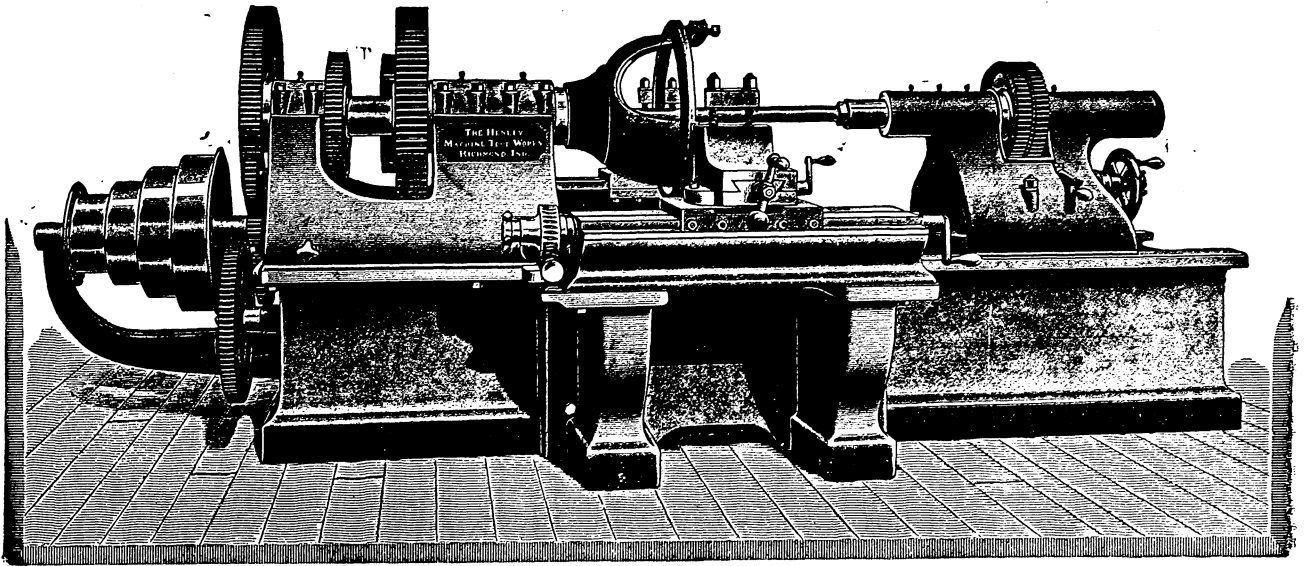
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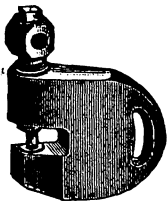
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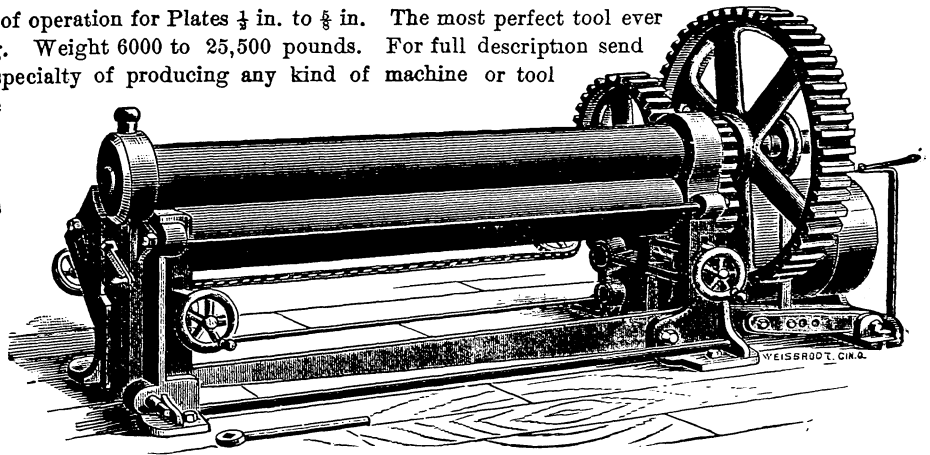
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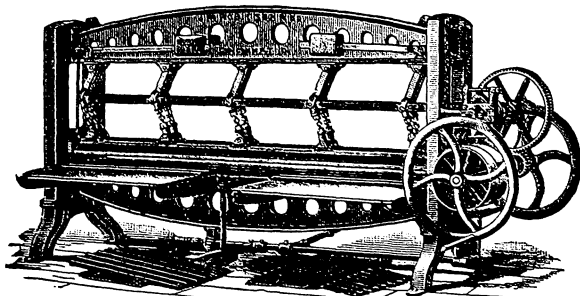
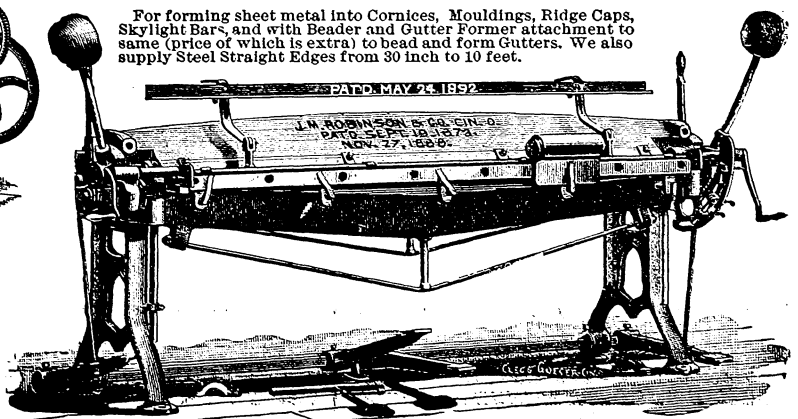


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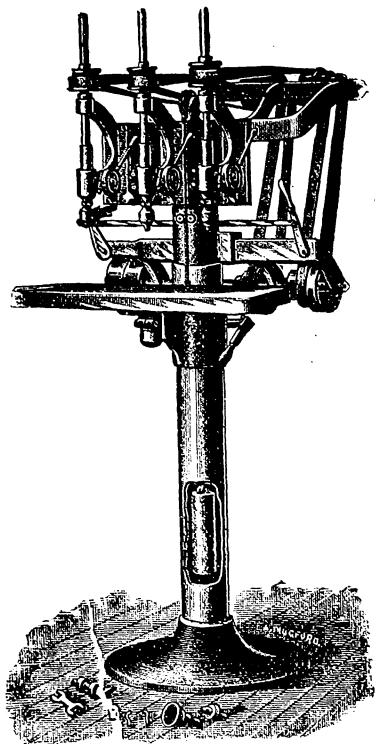
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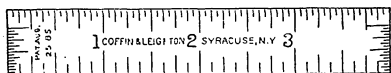
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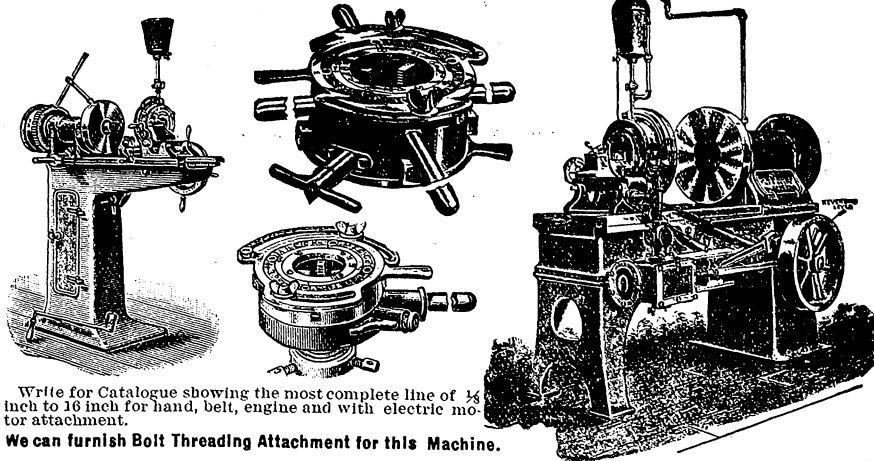
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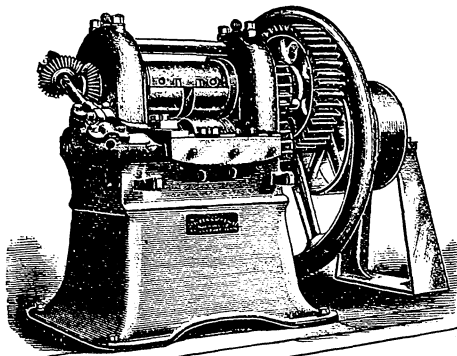
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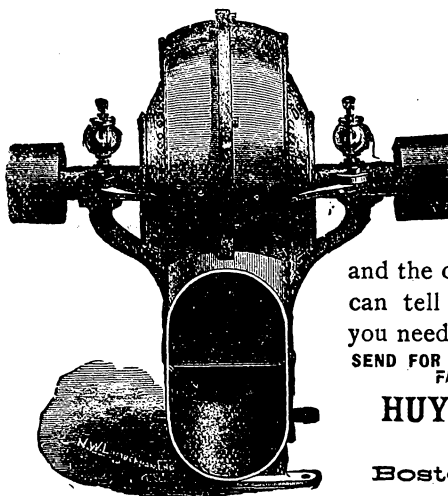
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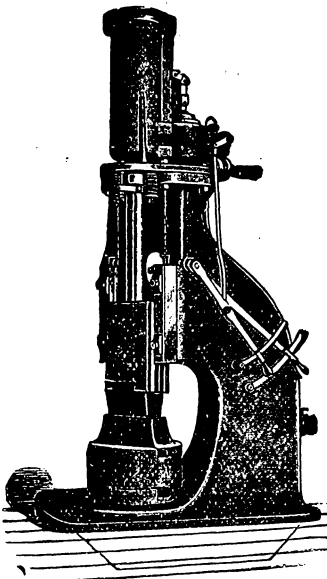
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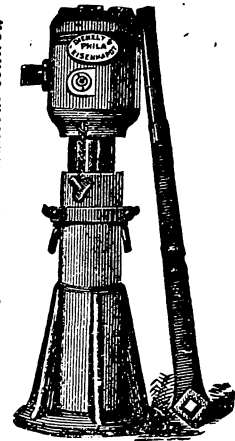
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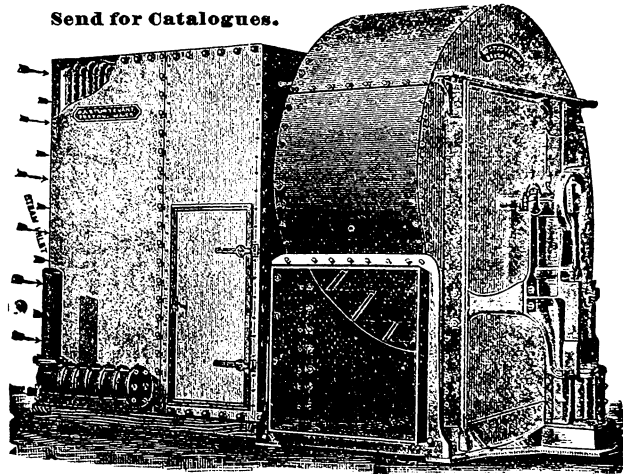
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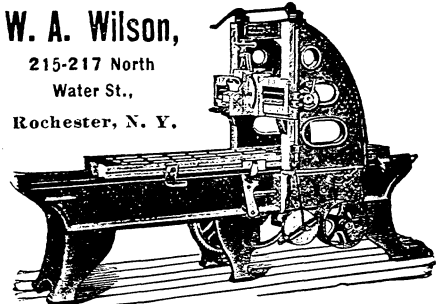
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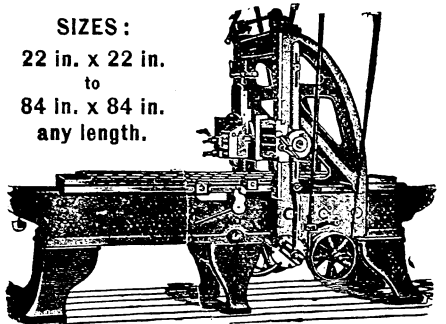


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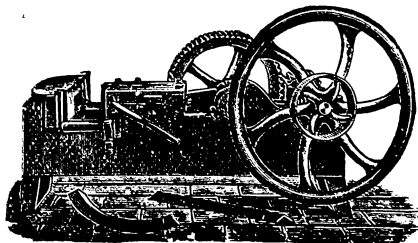
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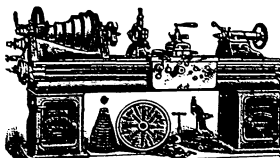
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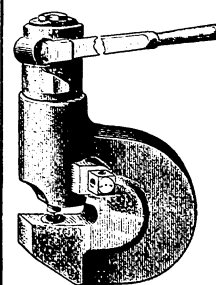
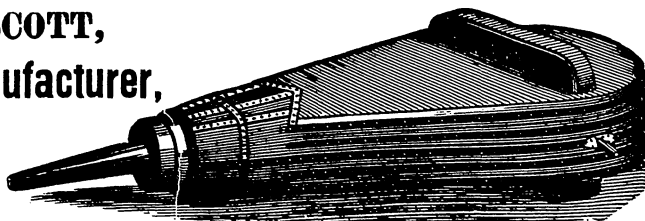
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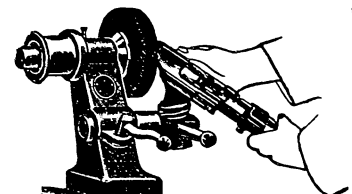
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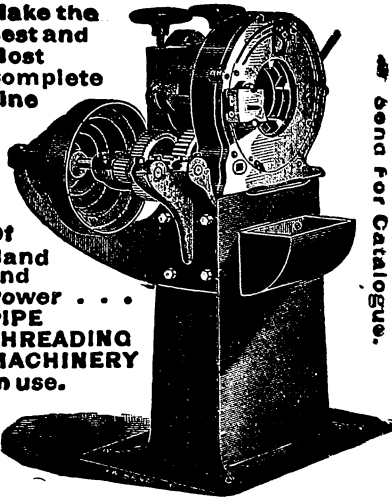
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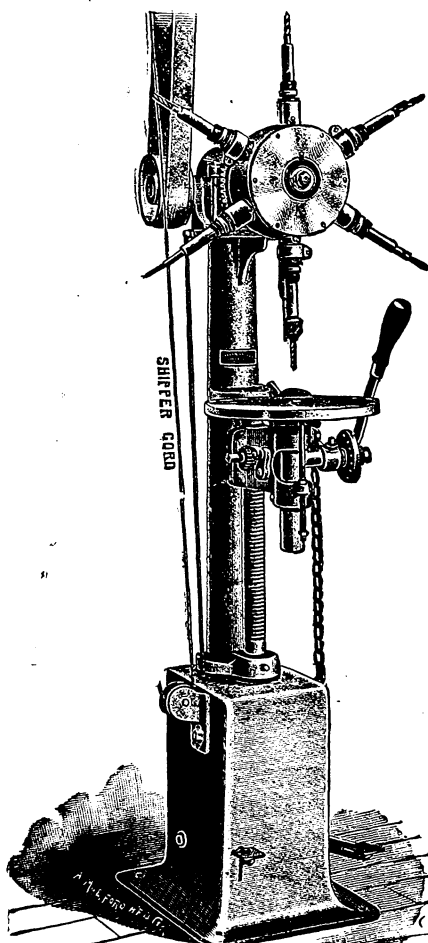
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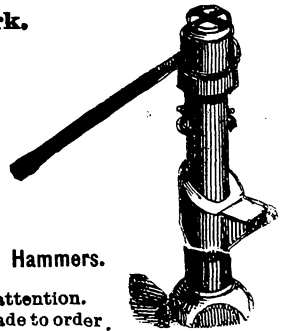
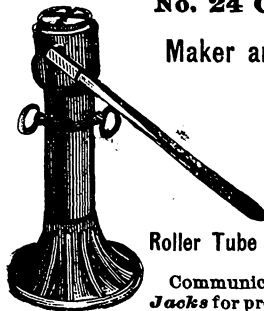
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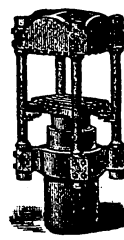
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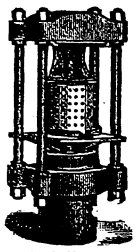
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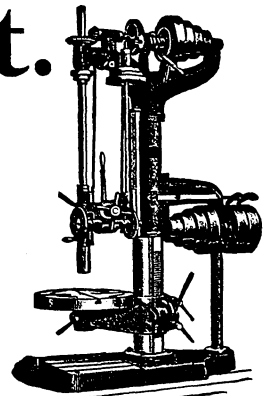
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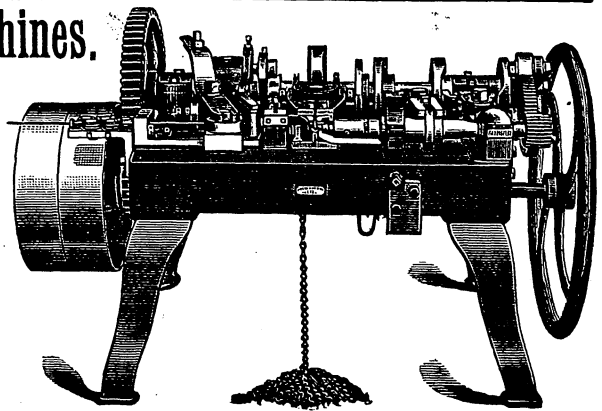
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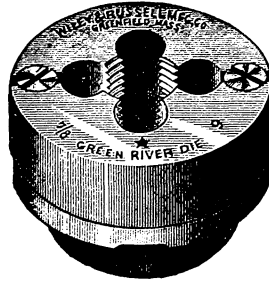
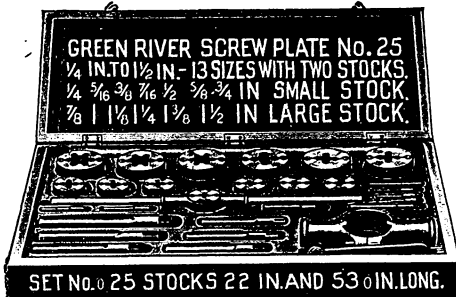
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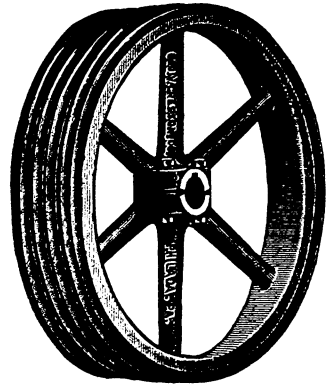
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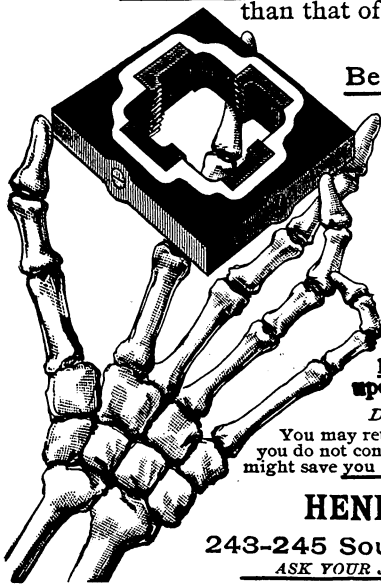
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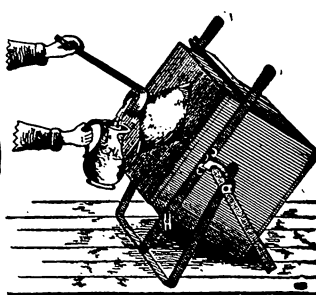
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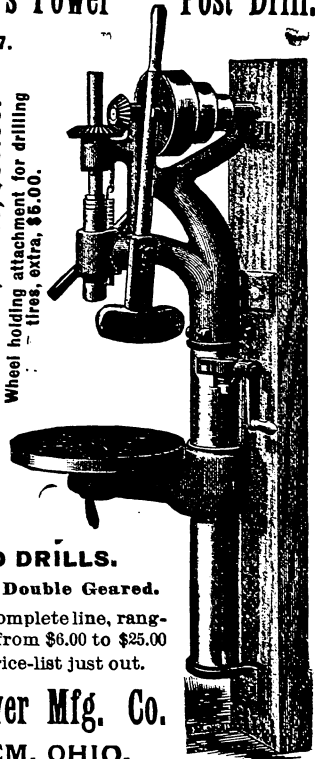
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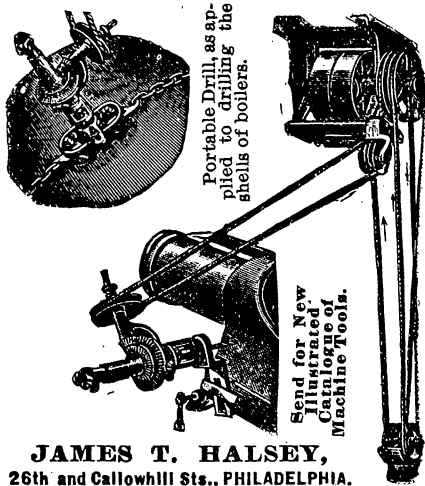
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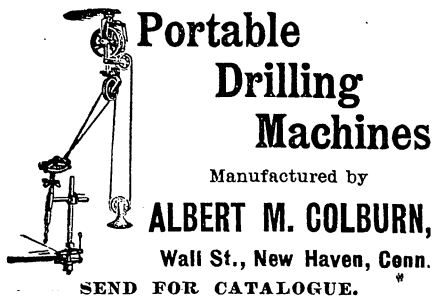
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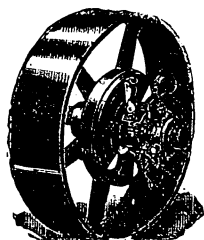


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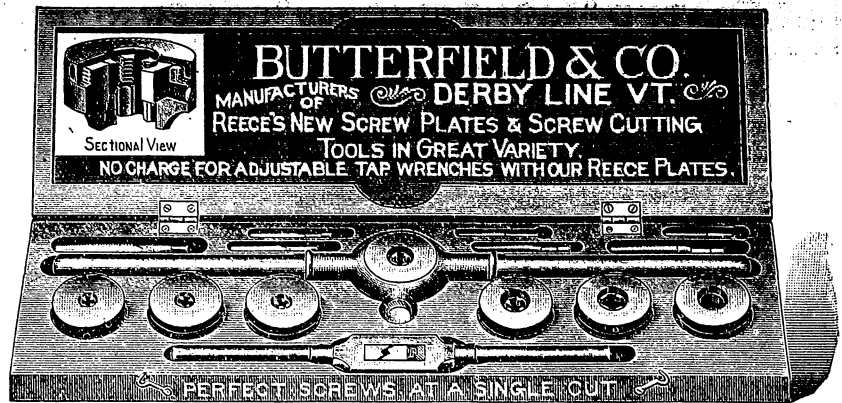
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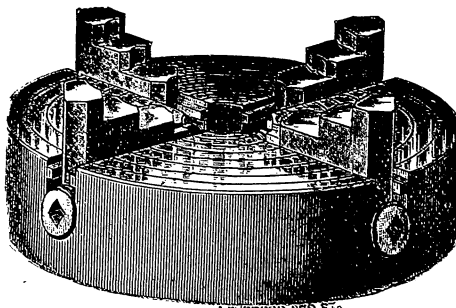
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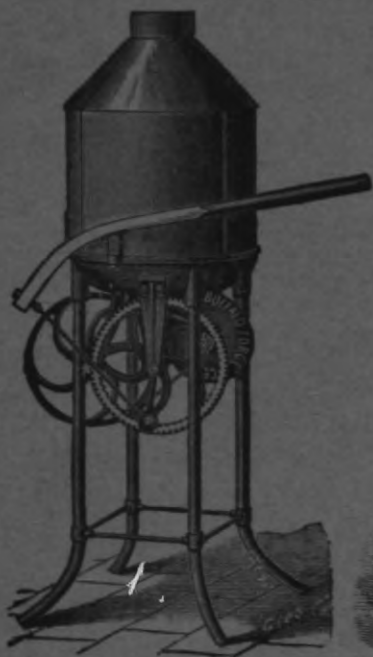
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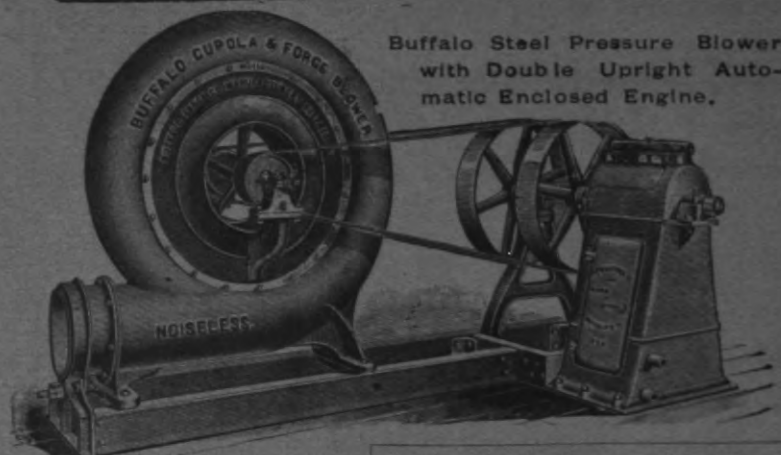


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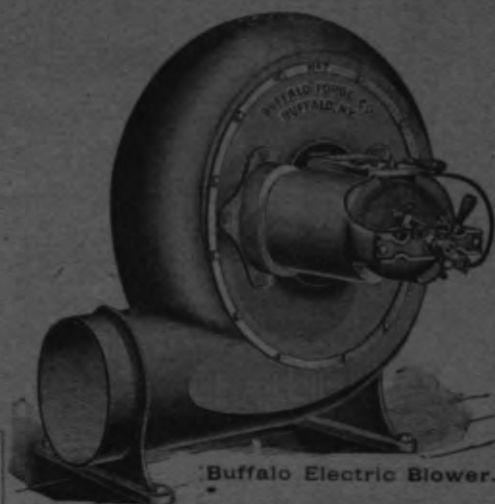
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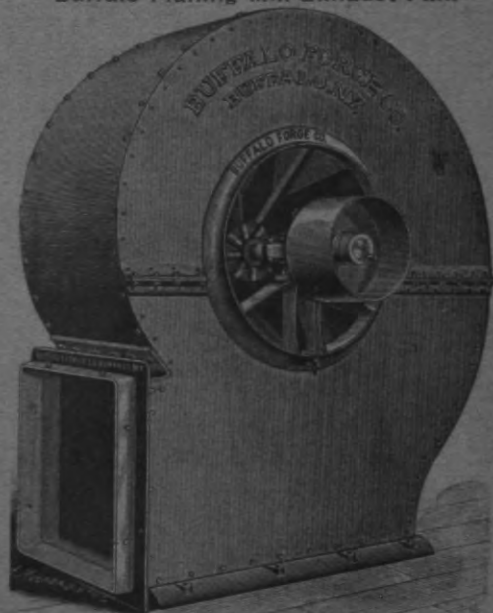
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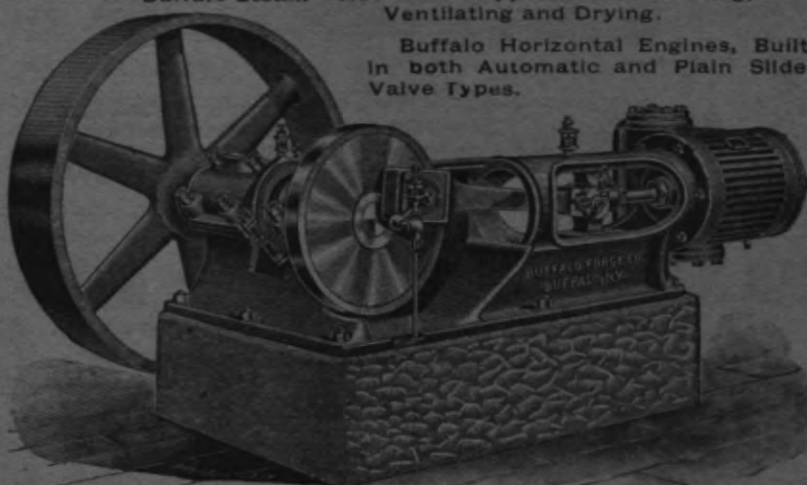
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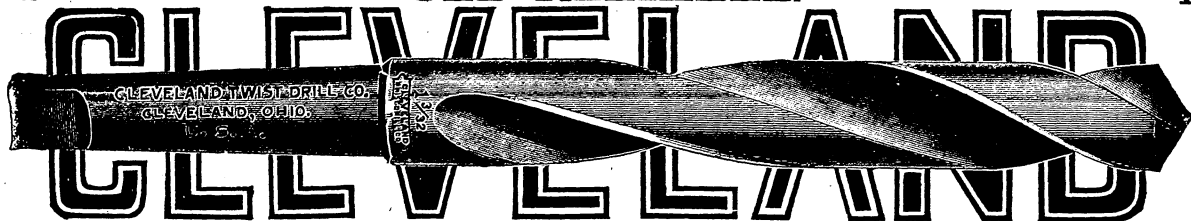
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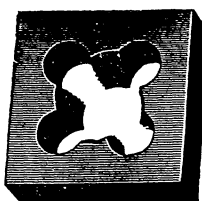
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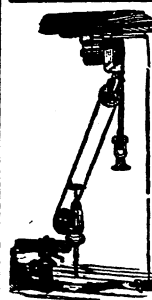
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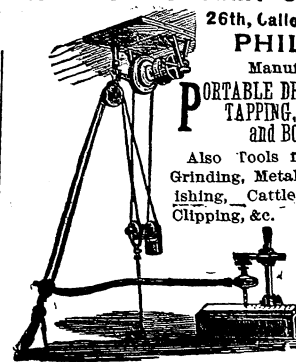
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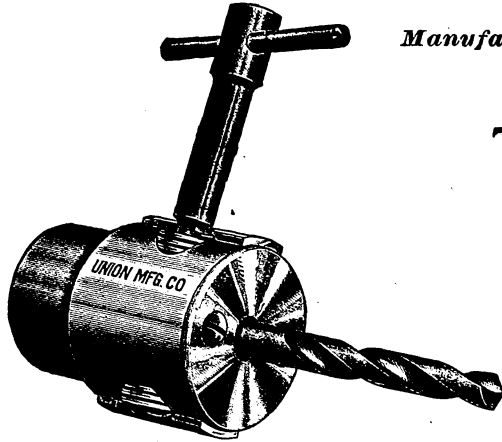
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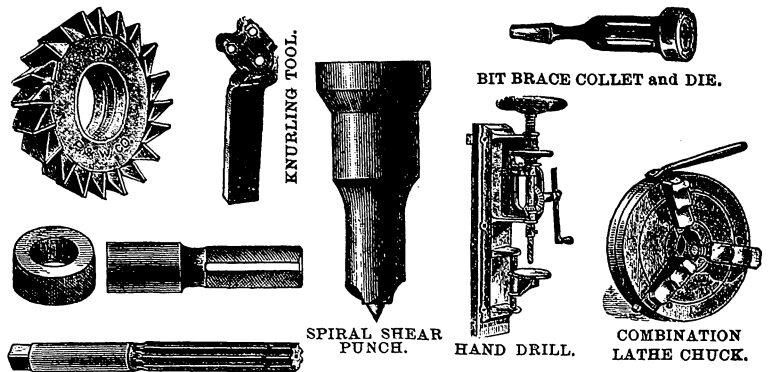
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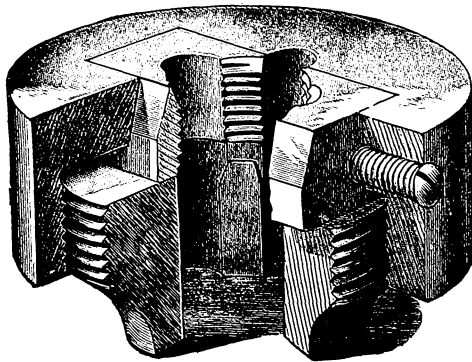
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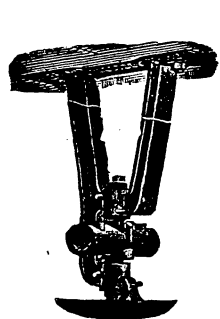
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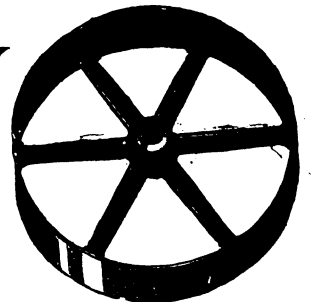
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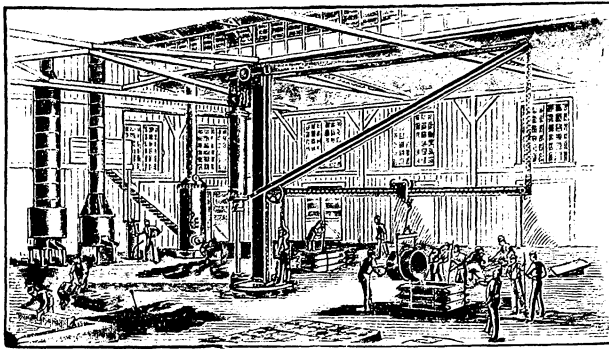


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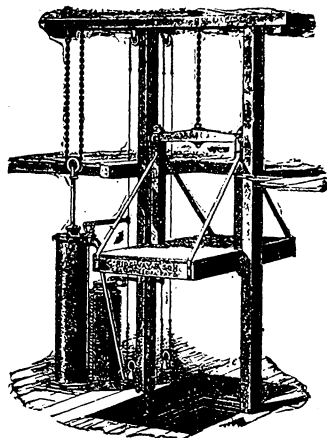
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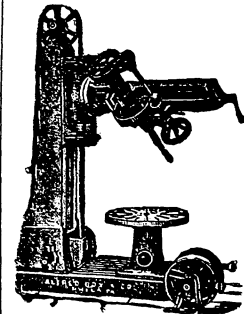
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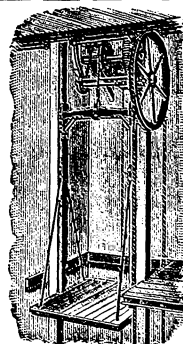
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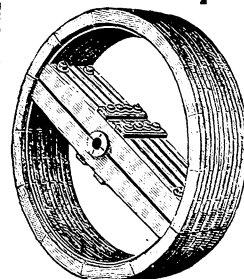
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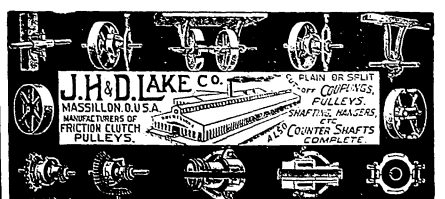
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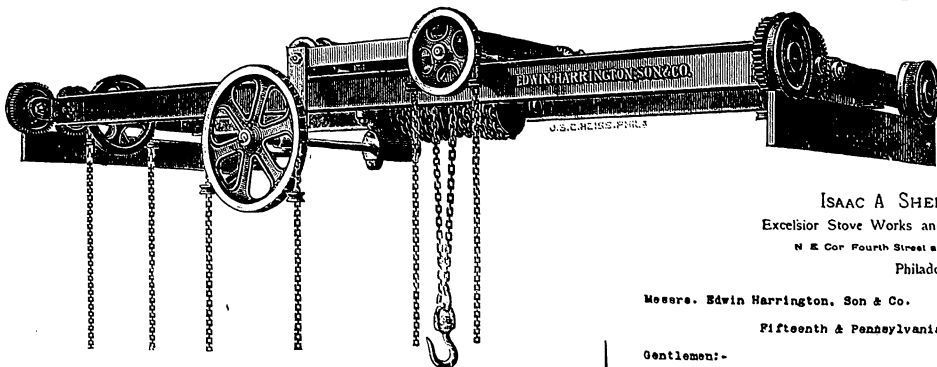


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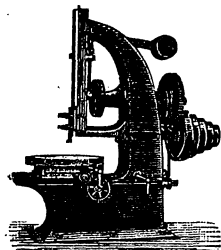
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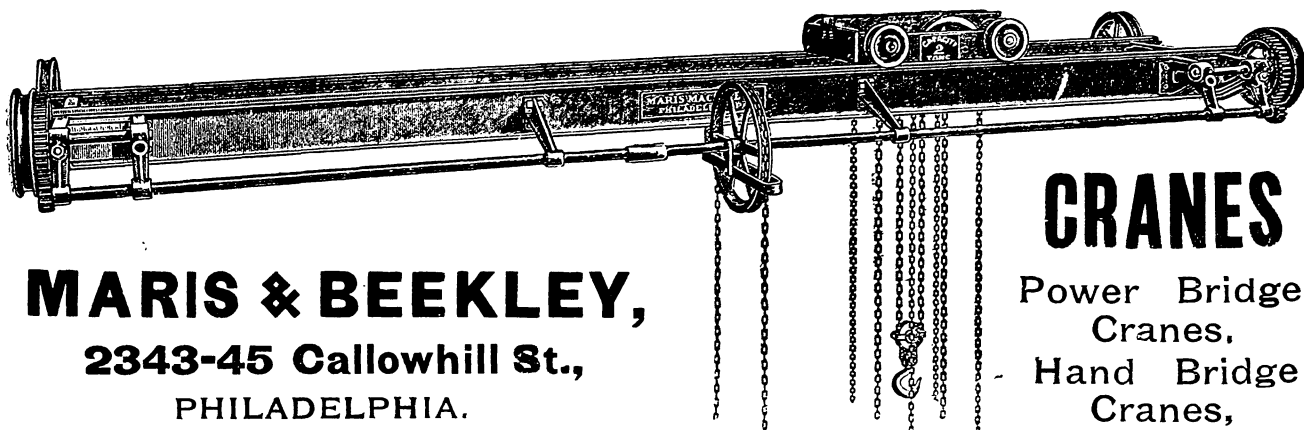
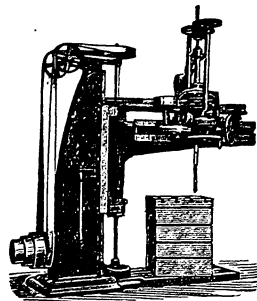


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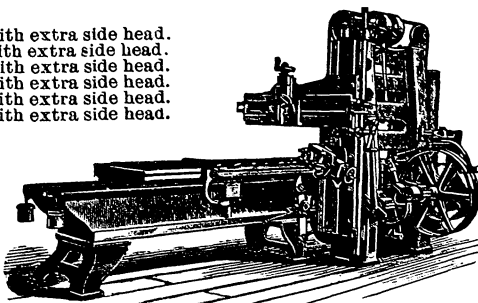
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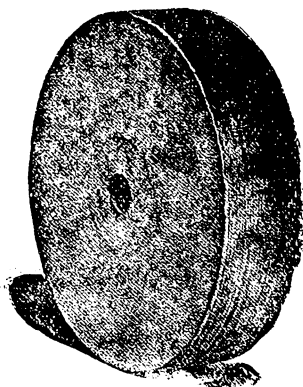


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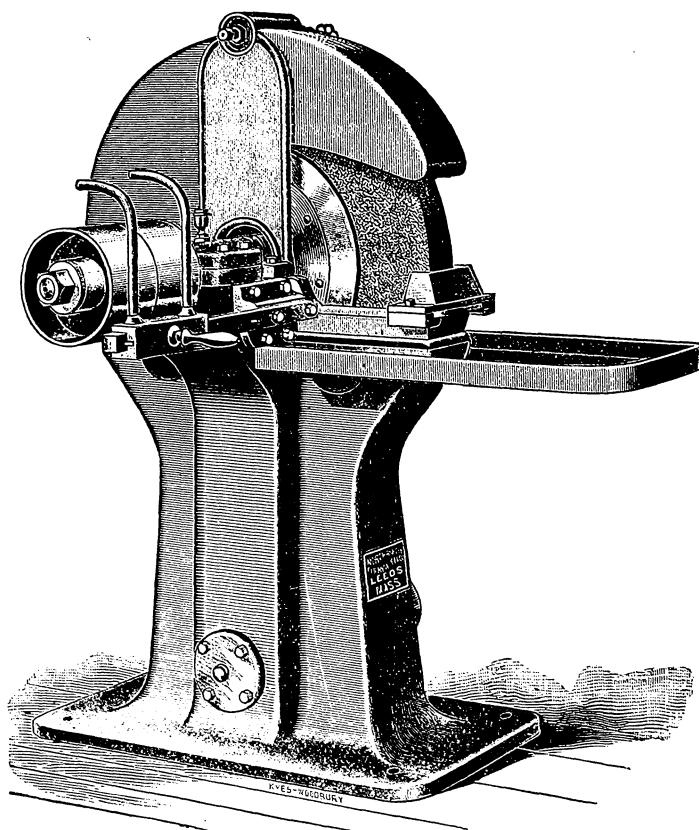
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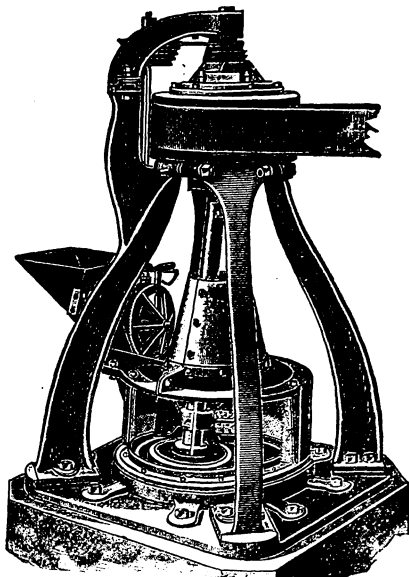
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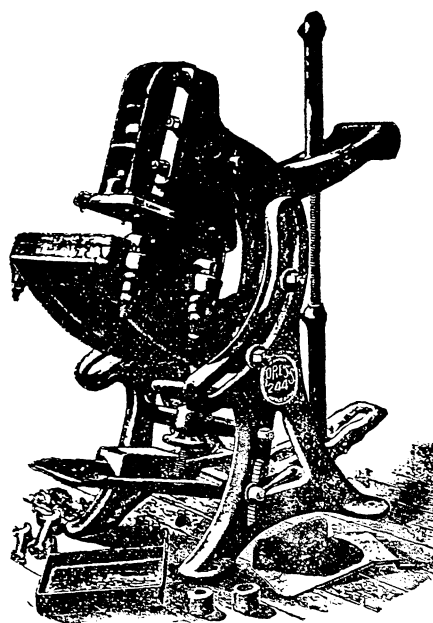
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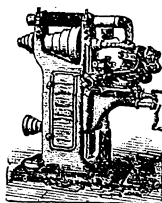
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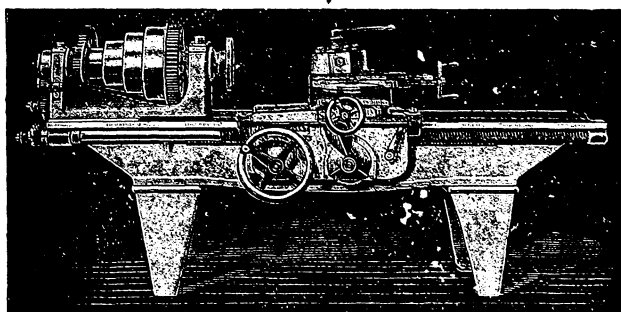
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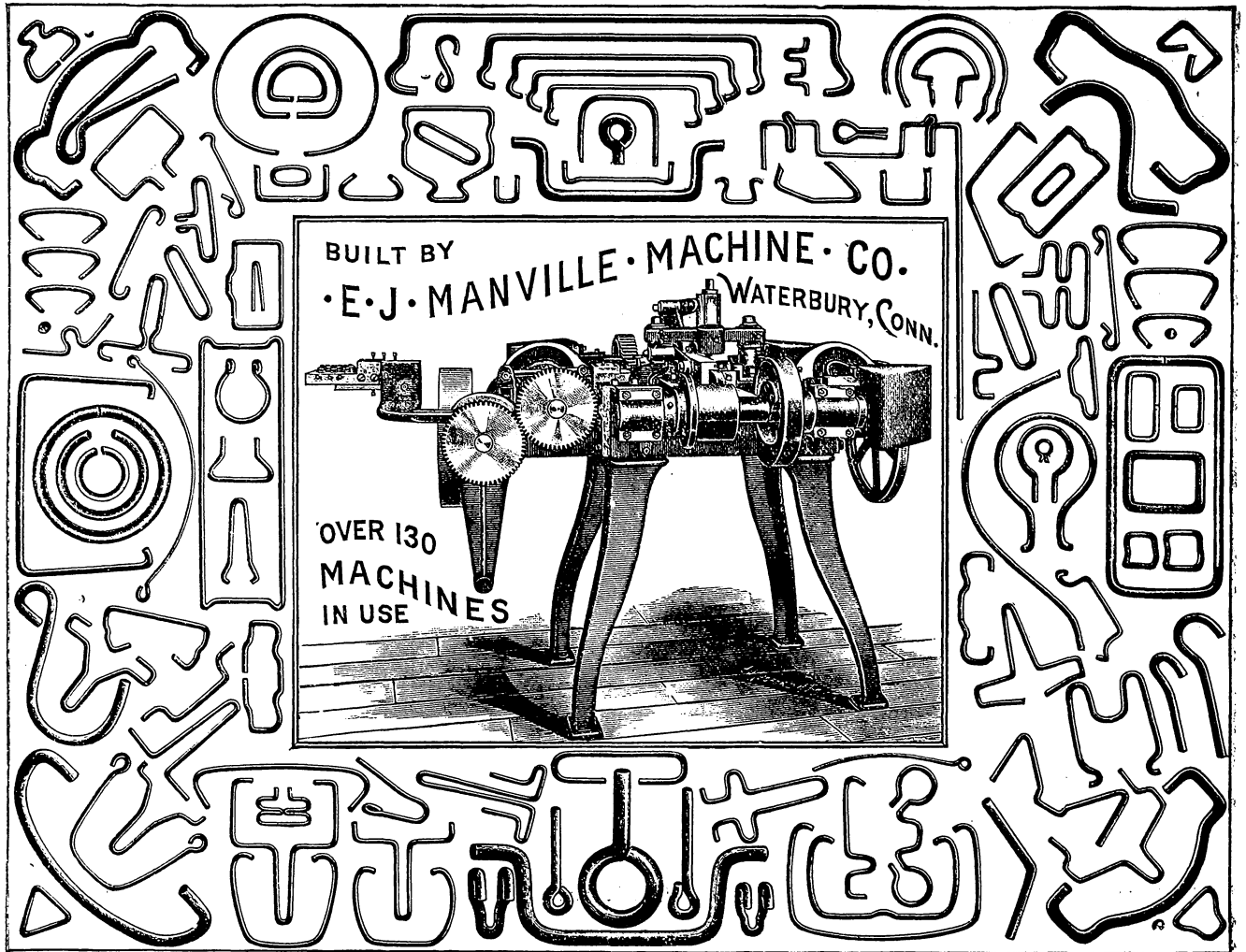
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Lincoln Pattern Miller.
1 Garvin No. 2 Miller and
Screw Slotter.
1 No. 3 Garvin Plain Mil-
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1 38 x 18 ft. N. Y. S. E.
Lathe. Also large stock of New Tools.

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Engines, all sizes, Slide Valve and Automatic.
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44 in. Radial Drill, 1½ in. National Bolt Cutter.
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10 lbs., 25 lbs., 60 lbs. hammers for belt.
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2 5 H.-P.
2 8 x 12 Horizontal Engines.
2 8 x 12 "
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Heavy Plate and Bar Shears, Engines,
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12 x 18; 11 x 20; 10½ x 12; 9½ x 12.

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16 x 48; 16 x 36; 14 x 24; 13 x 24; 12 x 24; 10 x
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Duplex Fire Pump also Brennan Crusher, Bo-
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For sale, one 2 high and one 3 high 30-inch Train, will
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A Variety of Machinery, Such as Boilers, En-
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Do you want to buy or sell Machinery? If so, write
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WANTED.

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"S."

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One Otis Steam Shovel in good condition.
Two 12 ton 3-ft. Gauge Locomotives.
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Also Pig Iron, Muck Bars, Bar Iron and Steel
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Trustee's Sale of Machine Shop Equipment.

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500 tons 35 lb. Iron T Rails.
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120 tons 30 lb. Steel T Rails.
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All selected and in excellent condition for relaying and only slightly worn.
Second hand selected and sound rails furnished in specified lengths for builders' use. For prices and particulars apply to

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FOR SALE.—A Superior Lot of Cast Iron Plates 2 ft. x 4 ft. They are made to avoid warping and cracking. Will sell in lots to suit.

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BLAKE PUMP, 14 x 16 x 18 in.
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All in good order.
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Bids on Heavy Machinery Castings, carload lots. Address
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WANTED.

A large sized, new or second-hand, Blake Crusher. Must be in good condition, and cheap for cash. Address

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FOR SALE AT LOW PRICES. NEW SOFT STEEL PLATES.

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For sale, to settle an estate, the machine shops of the late firm of Carter & Allen, adjoining and connecting with the Philadelphia & Reading Railroad at Tamaqua, Pa. The improvements include Boiler Shop, Foundry, Machine Shop, Erecting Shop, Pattern House, Boiler House, Blacksmith Shop, etc., etc. Also Machinery, including Engine, Shafting Drills, Lathes, Forges, etc., etc. Buildings are well adapted for their purposes. May be examined on application to

WALLACE GUSS,

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THE FIDELITY INSURANCE, TRUST & SAFE DEPOSIT CO.,
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WAYNE MACVEAGH,

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WANTED.

Second-hand Steam Hammer, about 9 in. cylinder. Must be in good order. Address, giving price and full particulars, "M. F. C.," 127, office of *The Iron Age*, 96-102 Reade Street, New York.

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400 tons of 60-pound, 200 tons 52-pound and 400 tons of 30-pound second-hand Steel Rails, suitable for relaying. For prices, etc., address

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Good stock of Hardware, invoice \$4000, good store building with living rooms above, valued at \$2500, in a good town in Southwestern Minnesota; only hardware store in the town; good established trade of \$15,000 a year. This is a rare chance to go into business. Address

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Stock and good will of a Builders' Hardware, Mantel and Grate, Door and Sash, Paint, &c. &c., store in one of the best manufacturing cities in central Ohio (population 50,000). Stock is clean and the store has done the principal business in its line for the last 10 years; a rare chance for some one with about \$15,000. Traders in real estate, &c., need not apply. Address "G. H. CO.," No. 127, office of *The Iron Age*, 96-102 Reade Street, New York.

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Stock of Hardware, Stoves, Paints and Glass, no agricultural implements, invoicing about \$30,000; no indebtedness or book accounts. One of the most solid towns in the middle West. Present owner has been in same business in same town for 40 years, and wishes to retire. Stock can be reduced considerably if desired. This is the cleanest stock in Minnesota. Address T. H. LOYHEB, Faribault, Minn.

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Radial Drill Press 38 to 44 in. swing. Address, with particulars and lowest price,

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An established shelf and heavy hardware business in a thriving town in Nebraska. Address
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To furnish reasonable estimates on specialties in light metal work.

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Manufacturers of Clock Trimmings, Rivets, Springs, &c.

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We are prepared to offer special inducements to a party wanting a good business, one that pays big profits for money invested. Stock consists of Shelf Hardware, Stoves, Tinware, Plumbing goods, Paints and Oils, and Tinner's Tools. Will invoice \$4500. Will take a good tinner as a partner or will sell the whole business. Located in a good farming country. It is a valley of 120,000 acres. Best of reasons for selling. Address

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Undisplayed Advertisements for Situations Wanted not exceeding fifty words Fifty Cents each insertion. Additional words one cent each.

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AS MANAGER OR SALES AGENT. Have had 10 years' experience as sales agent for a large corporation and am well known in the R. R. Steel, Iron and Blast Furnace trade; have had charge of works as well as office; best of references. Address "WORKER," office of *The Iron Age*, 96-102 Reade Street, New York.

BY PATTERN (ornamental) CARVER; first-class workman; wages, according to locality, or would contract. Address A. J. DYMOTT, 34 Walnut Street, Stamford, Conn.

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BY A PRACTICAL MACHINIST and Millwright, traveling, setting up machinery, (any class of mill set up) or taking charge of shop; will go anywhere. Address JAMES F. HEVRON, S. E. corner Front and Mifflin Streets, Philadelphia, Pa.

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BY AN EXPERIENCED Superintendent and Manager, position to take charge of light manufacturing business or shop; specialty: goods pertaining to the requirements of the steam and gas pipe trade; understands designing and constructing metal patterns, steam and hot water heating, cast and malleable iron foundry work. Address "R.," office of *The Iron Age*, 220 So. 4th St., Philadelphia, Pa.

WOULD LIKE to secure position with manufacturer of hardware or commission hardware house as representative on road or house position; having been a number of years in the business, with a road experience of six years, feel confident I can make myself valuable to any company; can furnish excellent references. Address "ENERGY," P. O. Box No. 182, Baltimore, Md.

BY A YOUNG married man, as Bookkeeper or Salesman with wholesale or retail hardware house; ten years' experience; best of references as to character and ability. Address "S.," Room No. 9, Third Floor, 104 West Fourth St., Williamsport, Pa.

YOUNG MAN, able and willing to work, with experience at bookkeeping and shipping, would like position with manufacturing firm; machinery or architectural iron work preferred; will start on small salary. Address "B. & S.," 127, office of *The Iron Age*, 96-102 Reade St., New York.

AS FOREMAN of Iron Foundry; best of references. Address "HENRY B.," No. 127, office of *The Iron Age*, 96-102 Reade Street, N. Y.

BY A THOROUGHLY EXPERIENCED man in general and builders' hardware, cutlery, guns, &c., as traveling salesman in any of above lines; wholesale house, manufacturer, or manufacturers' agent. Address "CUTLERY," office of *The Iron Age*, 59 Dearborn St., Chicago.

BY A THOROUGHLY experienced Hardware Traveling Salesman, either in store or on the road; thoroughly posted in builders' and general hardware, cutlery, tinware, &c. Address "GENERAL," office of *The Iron Age*, 59 Dearborn St., Chicago.

ACCOUNTANT AND BOOKKEEPER.—A young man with 20 years' experience as manager and bookkeeper desires a responsible position in any line of business; has had valuable experience in the iron business, is an expert accountant and an able financier, and can give the best of references; no objection to go to city or country. Address "ACCOUNTANT," office of *The Iron Age*, 220 So. 4th St., Phila., Pa.

MANAGER.—As manager of a retail hardware store, by a young man who has had experience in this line; references given regarding business ability, character and push from well known business men in the New England States. Address "N. E. STATES," office of *The Iron Age*, 96-102 Reade St., New York.

A GENTLEMAN with an extensive experience in engineering and manufacturing, and highly skilled in designing, estimating and contracting, production and cost sheets, technical and business correspondence, management, &c., is free to consider a responsible engagement; if desirable can take up some stock. Address "WELL QUALIFIED," office of *The Iron Age*, 96-102 Reade St., New York.

BY A MAN of large experience, an agency in Boston for a manufacturer or importer; references of the highest order furnished. Address "C.," No. 295 West Chester Park, Boston, Mass., Suite No. 3.

ARE YOU REPRESENTED IN ROCHESTER, N. Y.; I have an office in the center of the city, am a subscriber to *Dun's*, have had a valuable business experience and desire to represent manufacturers in this prosperous city and section. Address "REPRESENTATIVE," 223 E. and B. Bldg., Rochester, N. Y.

A MEMBER OF AMERICAN SOCIETY of Mechanical Engineers, who has had 20 years' practical experience as follows: machinist, head draughtsman, erector of steam plants engineering, estimating, contracting and office work and superintendent of large engine works, is available for responsible position. Address "A. B. C.," office of *The Iron Age*, 59 Dearborn St., Chicago.

BY CHEMIST of 4 years' experience in foundry, dry, open hearth, and blast furnace analyses; best of references. Address "OPEN HEARTH," office of *The Iron Age*, 96-102 Reade St., New York.

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BY AN EXPERIENCED HARDWAREMAN, ten years' experience, three years' on the road; good salesman and stock keeper; West or Southwest preferred; best of references. Address L. W. VIVION, Benton City, Mo.

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EXPERIENCED TRAVELER for Hardware and Notion Specialties to work largest towns between Boston and Kansas City; prefer to arrange on commission basis in connection with another line; must control trade and show good recommendations. Address "H. W. and NOTIONS," office of *The Iron Age*, 59 Dearborn St., Chicago, Ill.

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SALESMAN, to handle a general line of Wood, Enware Specialties, Household Articles, &c., to the wood and willow ware and hardware trades. Address SPECIALTY MFG. Co., Titusville, Pa.

SALESMEN to sell on commission to the hardware, plumbing and rubber trade the best and cheapest line of lawn sprinklers made; see advertisement in this paper. Address ETTE & HENGER MANUFACTURING Co., St. Louis, Mo.

THREE TRAVELING MEN with good recommendations who travel among hardware stores, plumbers and machinists to sell our Babbitt Metal and Solder as a side line; will pay commission. Apply to the SYRACUSE SMELTING WORKS, Syracuse, N. Y.

A FEW RESPONSIBLE PARTIES for the States of Pennsylvania, Maryland, Illinois, Ohio, Vermont, Massachusetts and Maine, to sell our high grades of Babbitt Metal and Solder, either on commission or as jobbers. Apply to the SYRACUSE SMELTING WORKS, Syracuse, N. Y.

SALESMAN with experience and trade in cutlery and hardware in New York State; state salary expected and where last employed. Address "EXPERIENCE AND TRADE," office of *The Iron Age*, 96-102 Reade St., New York.

COMPETENT FOREMAN, in wrought iron and wire factory; must be experienced in all its branches; give references and salary expected. Address "WIRE AND IRON WORKER," office of *The Iron Age*, Bank of Commerce Building, St. Louis.

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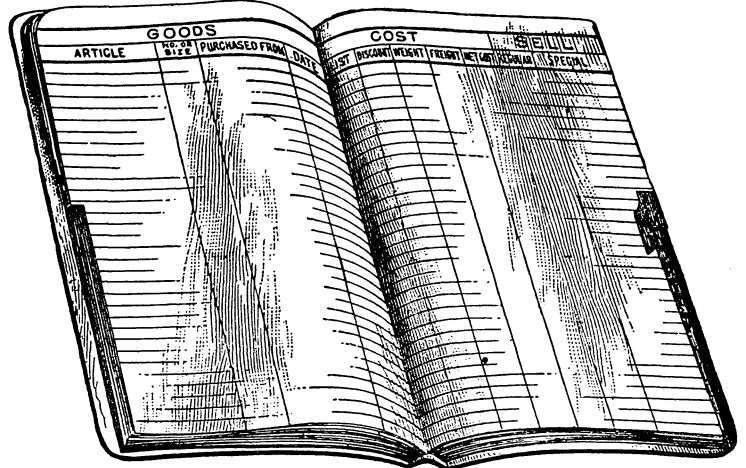
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Columns are provided for the name and number or size, for noting from whom purchased, date of quotation or purchase, list and discount, and for entering freight expenses as an element of cost. Under the heading of selling prices, the regular and any special price, or remarks in regard to the goods are given place. This book goes into considerable detail in describing the goods and cost prices. It has been arranged in accordance with the views of many Hardwaremen whose methods are careful and exact.

Size, 4 x 7 in.; grain seal leather.

FOUR EDITIONS:

A, 200 pages,	-	-	-	-	-	\$1.00
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A 2, 400 pages,	-	-	-	-	-	1.50
A F 2, 400 pages with flap,	-	-	-	-	-	1.75



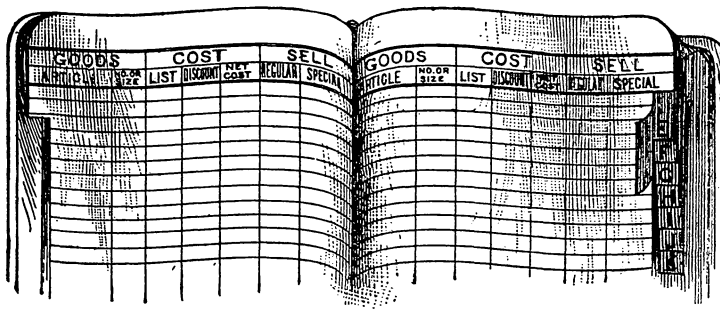
Hardware Price Book A.

In this book each page is complete, and the record of prices does not, as in Book A, run across two pages. Thus it accommodates a larger range of goods with much less detail in the record. It is adapted for office or store use, and by the use of familiar abbreviations, sufficiently large for the convenient and concise record of prices.

Size, 4 x 7 in.; grain seal leather.

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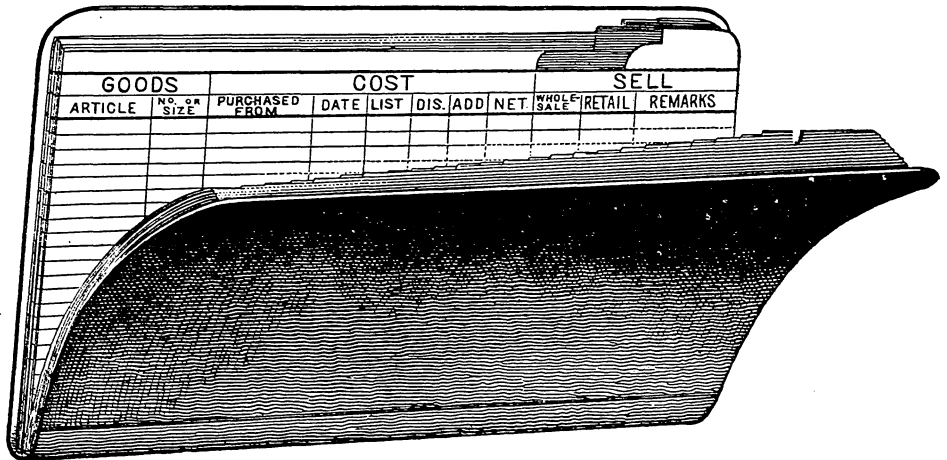
Hardware Price Book B.

The headings in Book C run across the top, in a line parallel with the hinge. In this way a very complete record can be kept on a single page. The details of weight and freight contained in Book A are omitted, and a single column headed "Add" given for the insertion of freight or other expenses which it is desirable to include in the cost. Under the selling prices space is left for the wholesale price, the retail price, and also for any remarks in regard to cost of the goods, desirability of pushing them, or other matters.

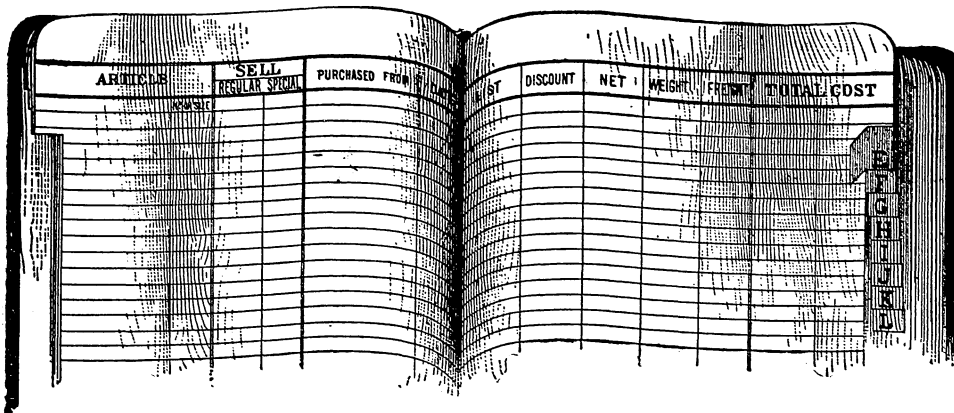
Size, 4½ x 7½ in.; grain seal leather.

FOUR EDITIONS.

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Hardware Price Book C.



Hardware Price Book D.

angement is adapted to the requirements of the trade in this direction. Size 5½ x 8 in.; grain seal leather.

FOUR EDITIONS.	D, 200 pages,	-	-	-	\$2.00	D 2, 400 pages,	-	-	-	\$3.00
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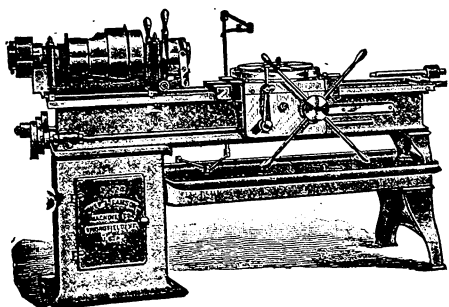
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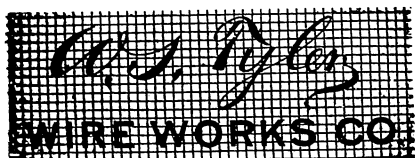


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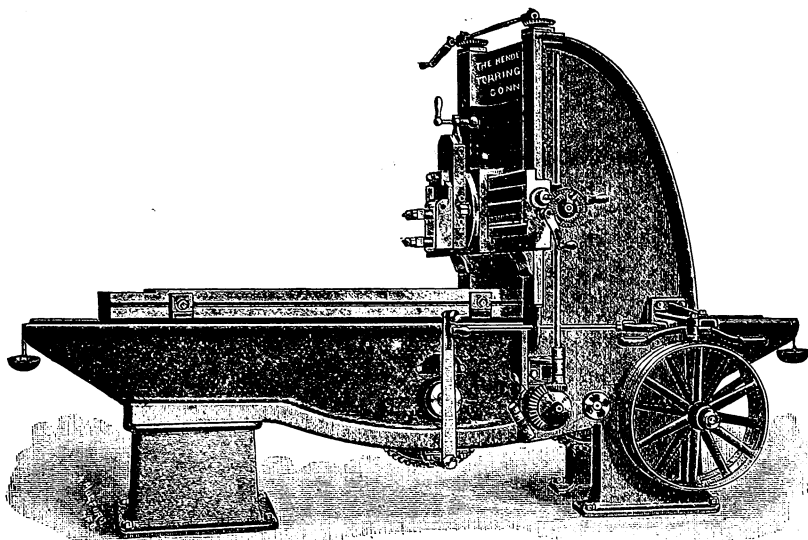
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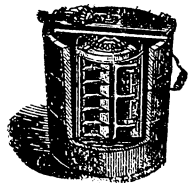


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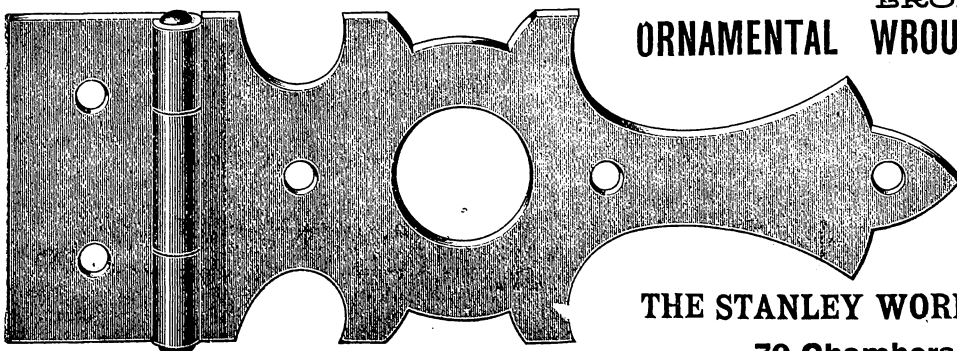
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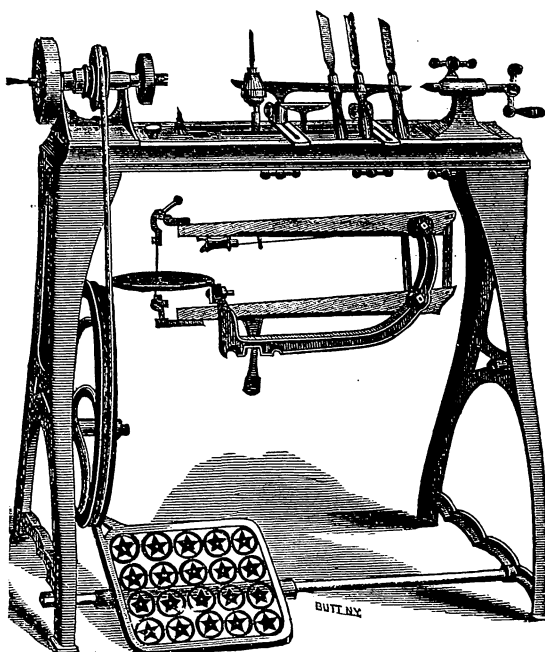
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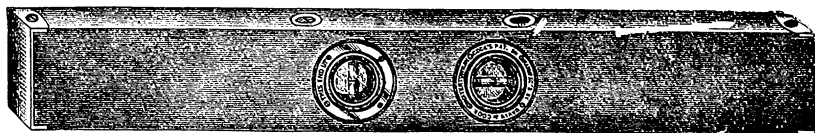
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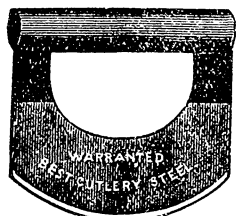
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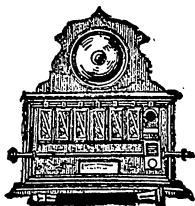


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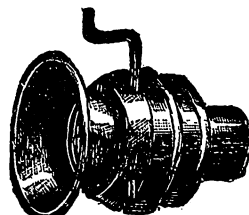
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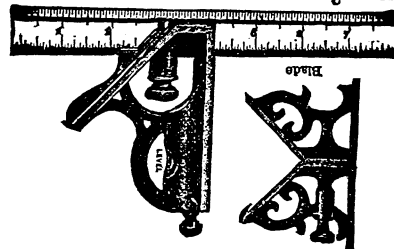
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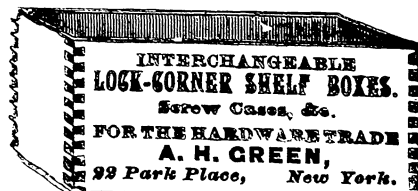
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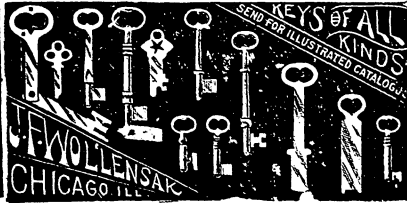
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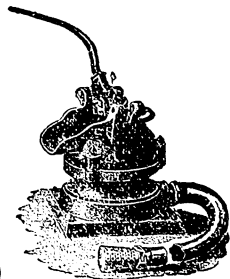
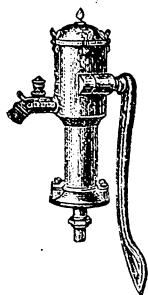
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Fig. 209.

Fig. 381.

Fig. 145.



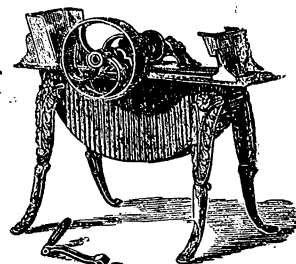
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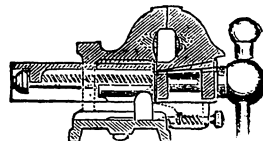


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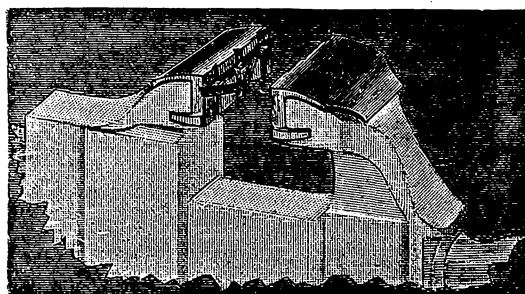
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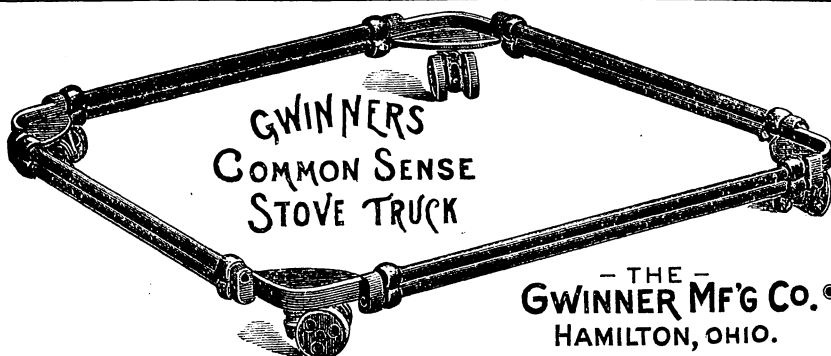
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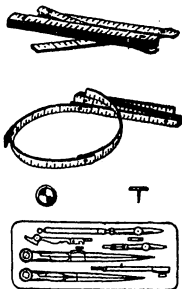


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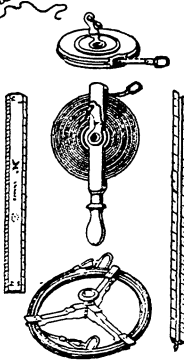
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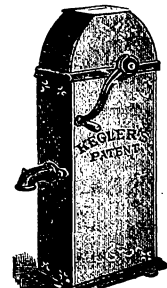
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Tubing weighs less than 1/4 lb. per ft., is connected by couplings and can be attached to any make of curb.

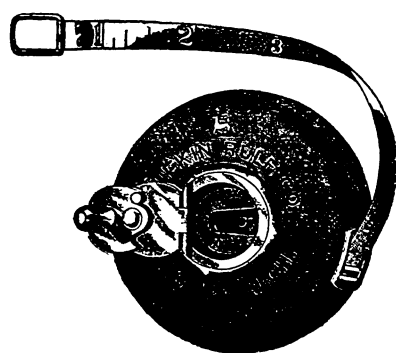


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Contains covered Internal Gear. Unequaled in the line of Pumping Wind Mills. We solicit the closest investigation. Also Columbia Steel Derricks, Iron Turbine Wind Engines, Buckeye Force & Lift Pumps, Tank and Spray Pumps, Buckeye and Globe Lawn Mowers, Iron Fencing, Cresting, Etc. Write for circular.

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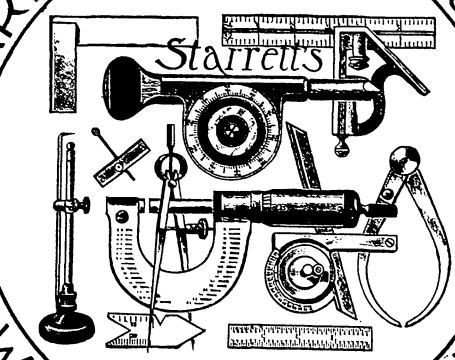
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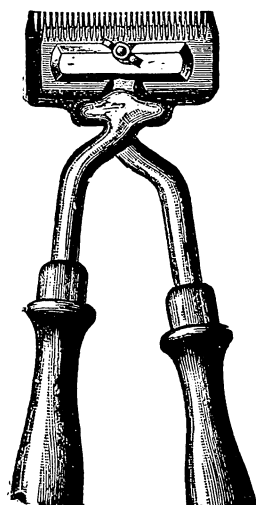
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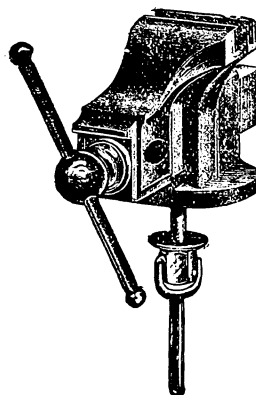
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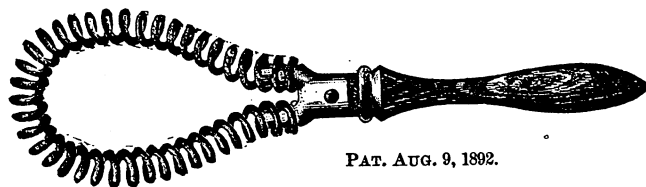
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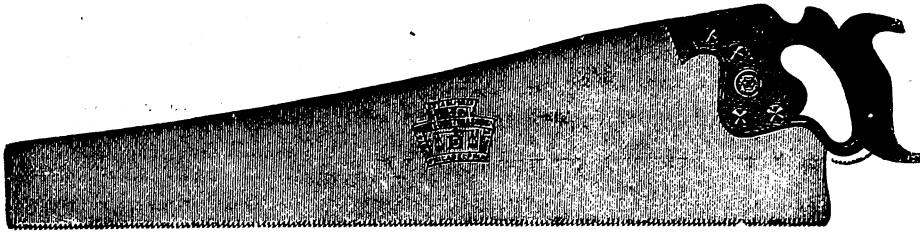
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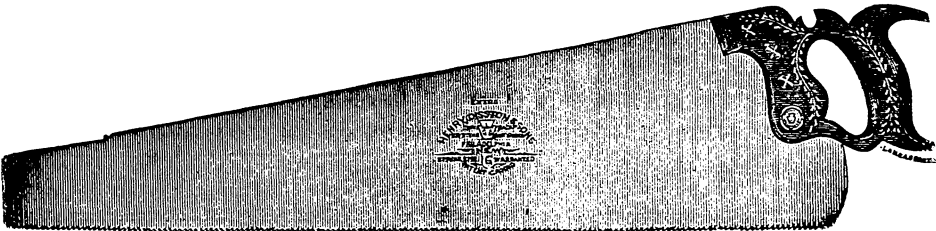
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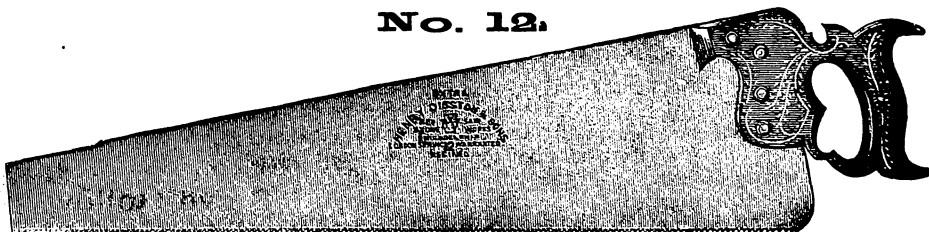
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AN EXTRA FINE SAW IN EVERY RESPECT.

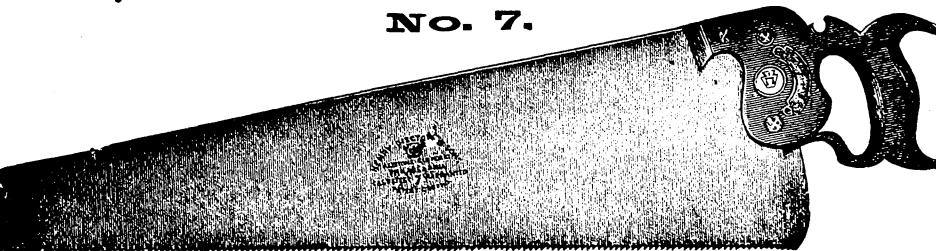
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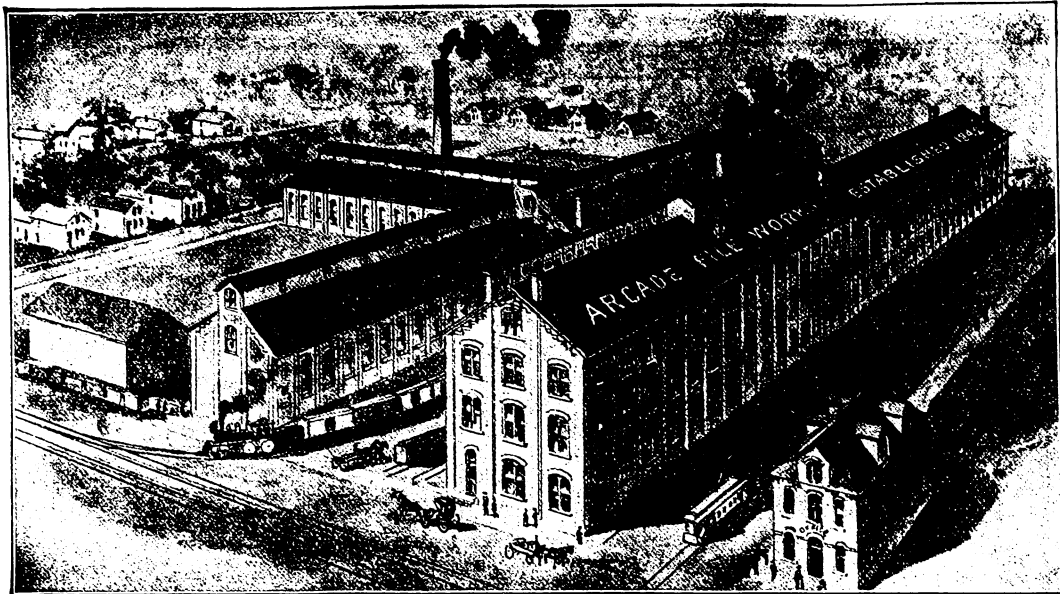
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Compiled by R. R. WILLIAMS, Hardware Editor of The Iron Age.

This pamphlet contains the principal standard Hardware price-lists in as clear and compact an arrangement as possible, so as to permit their being advantageously cut out and inserted in the price book. In order to make them adapted to this use they are printed on thin and tough paper of fine quality and on only one side of the paper.

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Pints.	Plain	Turled.	Tin'd or En'd.
1	\$0.30	.35	.39
1½	.32	.37	.44
2	.35	.39	.48
3	.42	.47	.56
Quarts.			
2	.50	.56	.63
2½	.53	.59	.68
3	.55	.62	.73
4	.60	.68	.84
5	.65	.75	.96
6	.70	.81	1.11
7	.75	.84	1.21
Gallons.			
2	.85	.96	1.31
2½	1.05	1.18	1.56
3	1.20	1.35	1.70

Wrenches.

Inches.	6	8	10	12	15	18	21
Black...	\$9.00	\$10.00	\$12.00	\$14.00	\$24.00	\$30.00	\$36.00
Bright..	10.00	11.00	14.00	16.00	26.00	32.00	38.00

Stove Hollow Ware.

POTS, KETTLES, ETC. (CAST IRON.)					
No.	6	7	8	9	10
Pots.....	\$0.65	.75	.85	1.00	1.25
Kettles.....	.55	.65	.70	.85	1.00
T Kettles.....	.75	.80	.90	1.00	1.25
Spiders.....	.27	.30	.35	.40	.50
Griddles Round	.22	.25	.27	.30	....
" Long..	.40	.50	.60	.75	....

SCOTCH AND YANKEE BOWLS.					
No.	1	2	3	4	5
Scotch Bowls..	\$0.35	.40	.45	.50	.60
Yankee Bowls.	.35	.45	.55	.65	.75

Glue Pots.

No.	4/0	\$4.50	No.	2	\$8
3/0	5.00		3	10	
2/0	5.50		4	12	
0	6.00		5	14	
1	6.75		6	16	

Some merchants use this pamphlet for reference, checking off invoices, etc., as it gives the leading lists in a more convenient form than they can otherwise be obtained. The lists are, however, intended primarily to be cut out

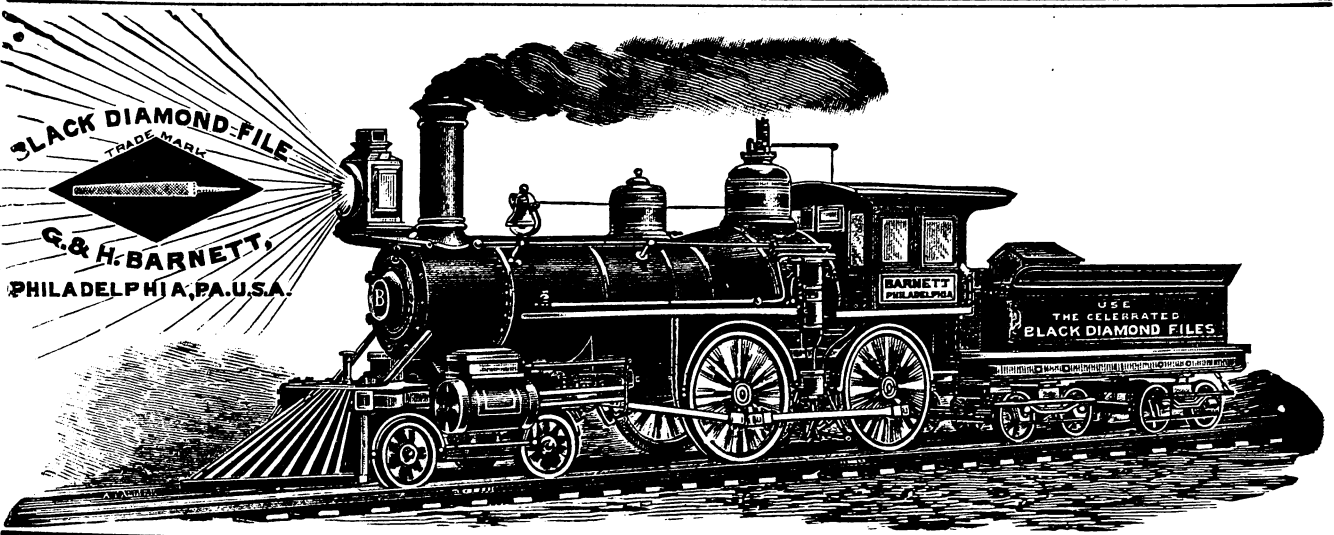
and inserted in price books, and can be used in connection with any of The Iron Age Hardware Price Books.

That the Standard Hardware Price Lists meet a want of the trade is evident from the fact that a Third edition is already called for.

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Specially Adapted for Use on Wire Fence.

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Price-List on Application.

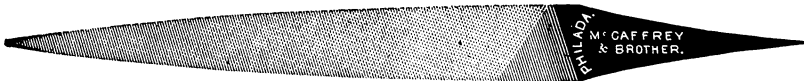
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STEEL.		PRICE
STRONGEST	BANKER & WHITE,	LET
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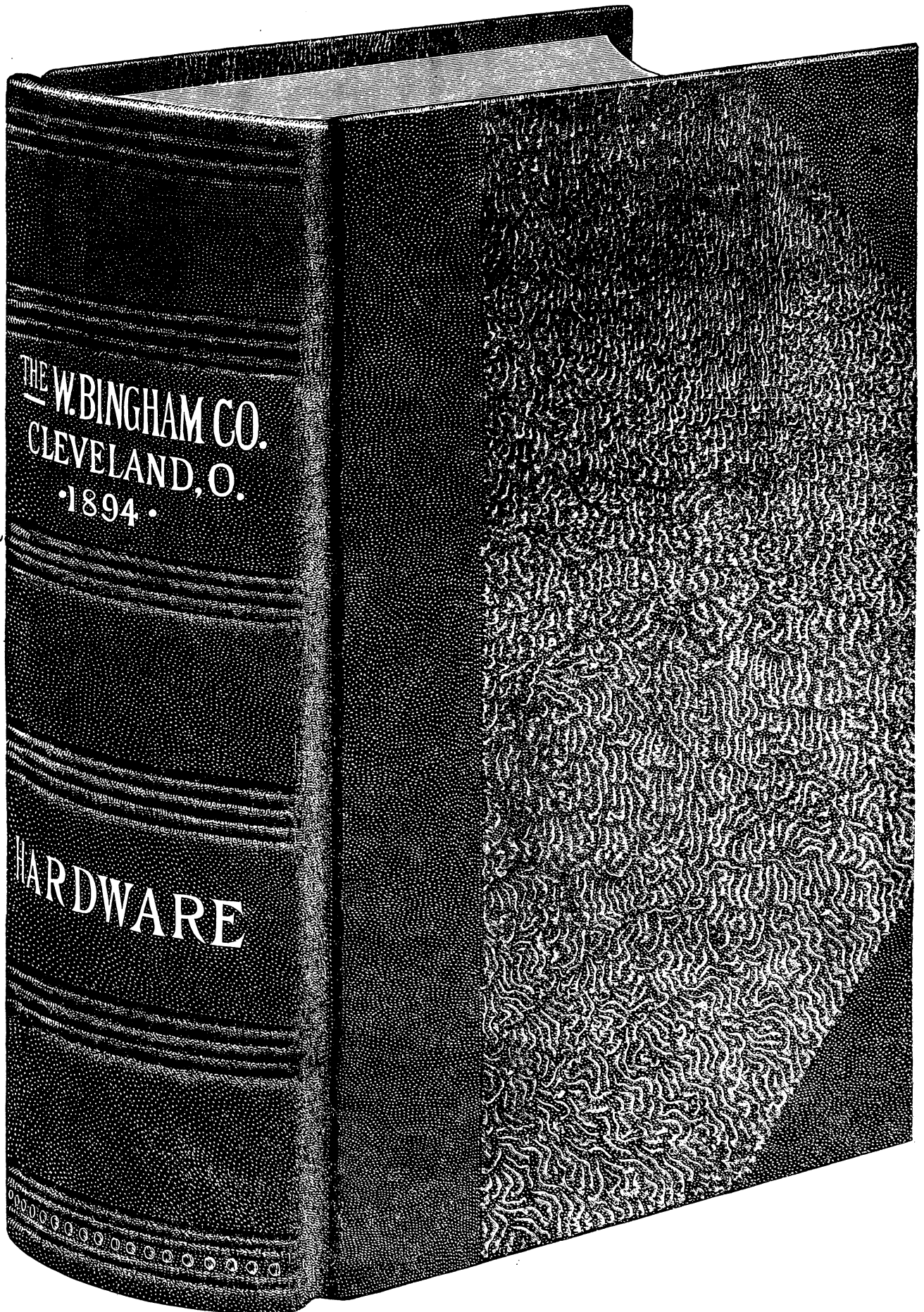
Hardware dealers have been vieing with each other for the past few years to see who could get out the largest catalogue, until the books have become so cumbersome that they are a burden. It has been our aim in issuing our 1894 catalogue to reverse the order of things, and to see how **SMALL** a book we could get out and at the same time illustrate our complete line of hardware and do it distinctly and comprehensively. How well we have succeeded we will leave it for our friends to judge. On the opposite page is a full size cut of the book. It contains 1476 pages besides the index, and weighs 5 lb. 10 oz.

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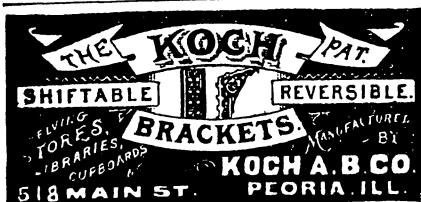
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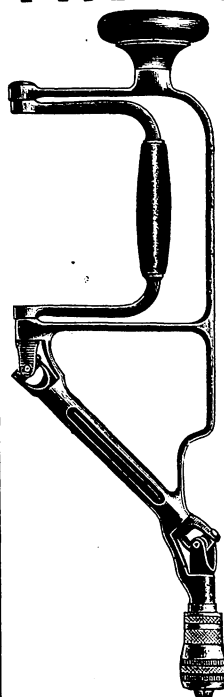
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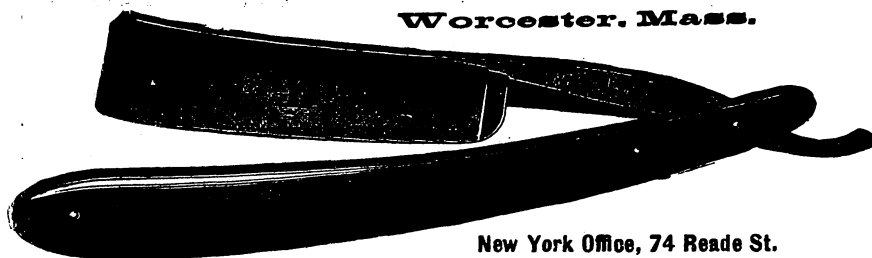
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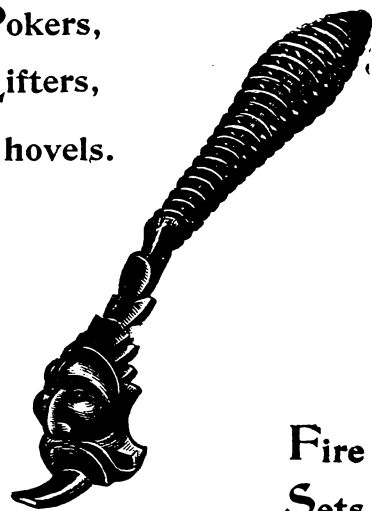
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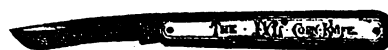
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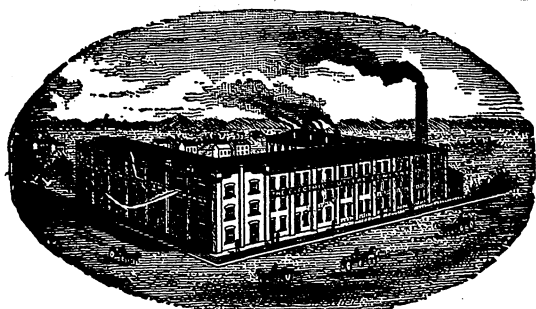
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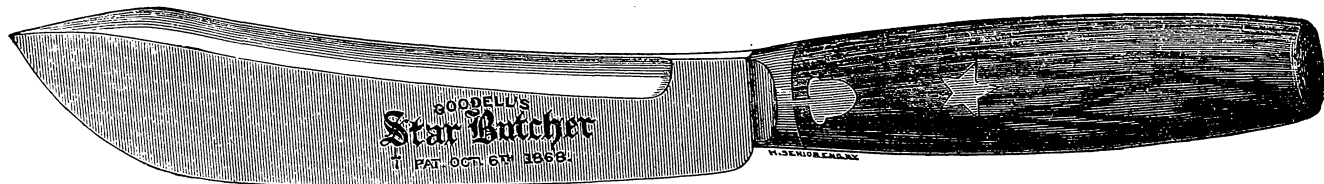
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Made in Plain Steel or Heavily Plated Blades, Hand Burnished.

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WE DON'T KNOW HOW TO IMPROVE IT.

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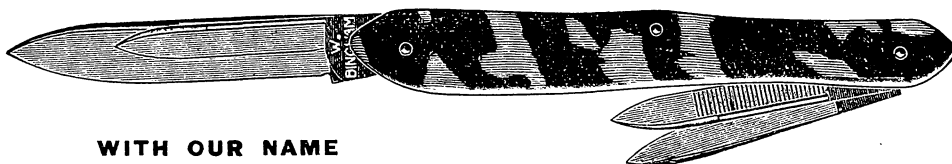
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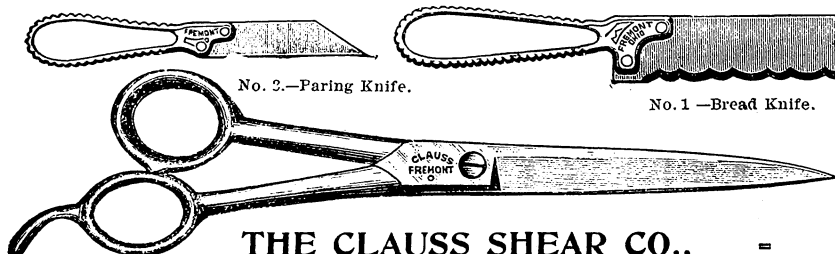
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buy.



No. 2.—Paring Knife.

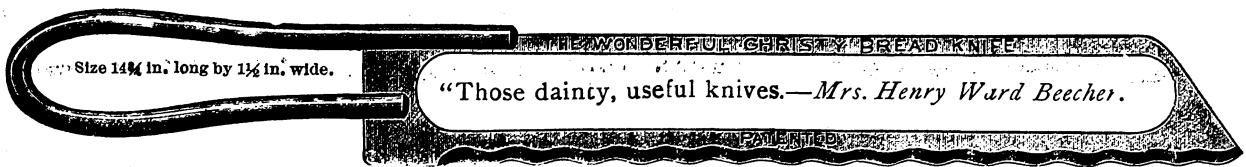
No. 1.—Bread Knife.

THE CLAUSS SHEAR CO.,

That's what the "CLAUSS" Knives and Shears
always do. People buy Cutlery for use, not orna-
ment, hence they purchase "CLAUSS" productions
because they can be relied upon to last and give
satisfaction. Write for Prices and Discounts.

Fremont, Ohio, U. S. A.

Cut?



Size 14 1/4 in. long by 1 1/2 in. wide.

"Those dainty, useful knives.—Mrs. Henry Ward Beecher."

Solid steel from tip to tip, with *Scientific Grinding* of the Razor Steel Blade, carefully tempered and sharpened ready for use—Warranted perfect in every respect.

Ask your wholesale dealer for prices on Christy Knives. There are imitations and counterfeits with cast iron handle—cheap but not good.

You will find it profitable to be posted on Christy Knives.

THE CHRISTY KNIFE CO.,
FREEMONT, OHIO.

—NEW YORK OFFICE; 97 Chambers St.—

NICHOLS BROTHERS, Greenfield, Mass., U. S. A.

BUTCHER KNIVES, CLEAVERS, STEELS, ETC.

TRADE DISCOUNTS AND CATALOGUE ON APPLICATION.



The Bridgeport Chain Co.'s Triumph Chain, made into Halters, Traces, Cow Ties, Tie-outs, Kennel Chains, &c.; also cut to lengths for manufacturers' use.
The cut represents the exact size of 6/O.
Thirteen Sizes made, 6/O being the Largest.

FACTORY AT
BRIDGEPORT, CONN.

Drills for Wood & Metal, Counter-sinks, Screw Drivers, Chucks, &c., for sale by the trade.

Syracuse Twist Drill Company,

SYRACUSE, N. Y.



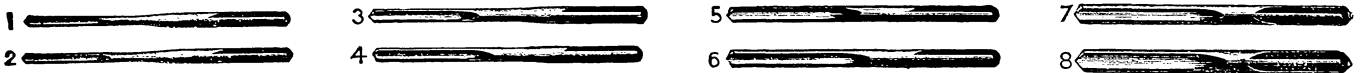
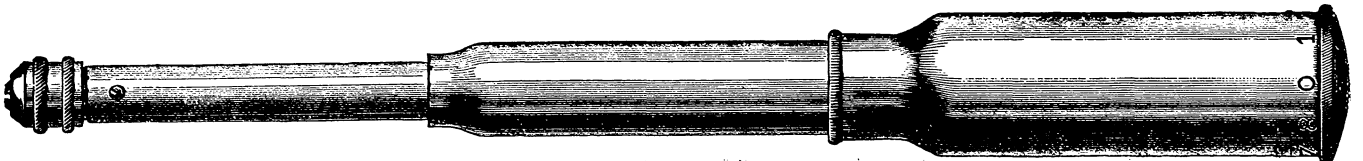
Every tool fully Guaranteed. Beware of imitations.



DRILL POINTS
Always in the Handle.

THE BEST AUTOMATIC DRILL IN THE WORLD.
GOODELL No. 3.

SEND
FOR CIRCULAR.



H. H. MAYHEW CO., - - - SHELburnE FALLS. MASS., U. S. A.
Manufacturers of Fine Mechanics' Tools.

SNELL MANUFACTURING CO., 72 Reade St., New York,

MANUFACTURERS OF

Ship Augers, Auger Bits, Boring Machines and Boring Implements.

ESTABLISHED 1790.

FIRST PREMIUM AWARDS: Mass., 1841, 1848, 1850; International Ex., Paris, 1878; Centennial Ex., Phila., 1876



Manufacturers of Car Bits, Jennings' Pattern Auger Bits, Boring Machine Augers, Carpenters' Augers, Mill Augers, Rafting Augers, Gimlets and Gimlet Bits, and Screw-driver Bits.

All Kinds of Machine Bits Made to Order.

All Goods made of the Best Quality of Cast Steel and Warranted. First Premium Medals taken for Superior Quality and Excellence of Finish.

Factory, - - - Fiskdale, Mass.



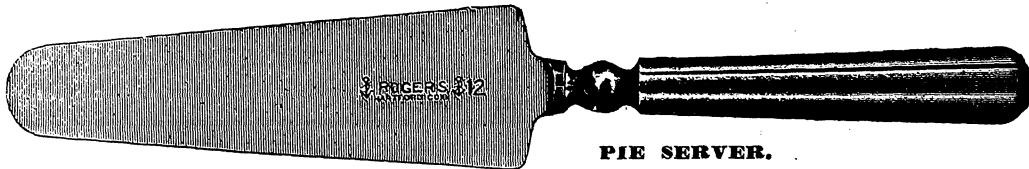
N. Y. Office, 103 Chambers St., W. H. QUINN, Manager

—NONE BETTER—

THAN THE



SILVER PLATED WARE.



PIE SERVER.

MANUFACTURED BY

THE W. M. ROGERS MFG. CO.,

Office and Factory, HARTFORD, CONN. P. O. Drawer 30.

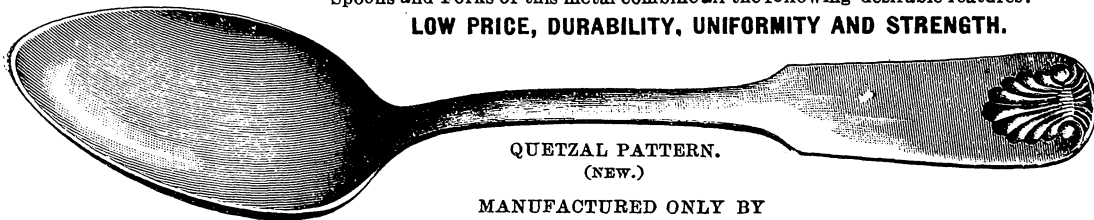
NEW CATALOGUE FOR THE ASKING.

AZTEC COIN METAL

MADE INTO SPOONS AND FORKS.

Spoons and Forks of this metal combine all the following desirable features:

LOW PRICE, DURABILITY, UNIFORMITY AND STRENGTH.

QUETZAL PATTERN.
(NEW.)

MANUFACTURED ONLY BY

THE HOLMES & EDWARDS SILVER CO.,

Bridgeport, Conn.

AZTEC COIN METAL
has no plating to
wear off. Made
of solid metal.
Easily kept clean.

Solid Columbian Silver Flat Ware, a Substitute for Solid Silver.

WARRANTED FOR 25 YEARS.

—THE—
UPSON & HART CO.,

UNIONVILLE, CONN.

There is no plating to wear off and no rusty edges. The cost is no more than silver plated goods. Hotels and restaurants appreciate this great change, which will, no doubt, in time revolutionize the steel knife trade. We ask the trade not to confound this metal with silver metals, nickel silver or any other quack named goods which are flooding the market at the present time.

SELL AT SIGHT.

KNIVES,
FORKS &
SPOONS

Also manufacturers of Silver Plated Flat Ware in Knives, Forks, Spoons, Sugar Shells, &c
A sample dozen will be sent on approval to any house in the United States, with prices and discounts. Remember it costs nothing to investigate.

IF YOU WANT THE BEST
FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

IF YOU WANT THE BEST
FOR CATALOGUE & PRICES
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FOR CATALOGUE & PRICES
THEIR MAKE IS EQUAL
IF NOT SUPERIOR
TO ANY OTHER
HAVE BEEN IN BUSINESS SINCE 1840.

BAILEY

Single Spiral Double Cutter Auger Bits and Augers.



We have purchased from the assignee of the Bailey Auger Bit Co. the entire stock of their auger bits, car bits and augers, and offer them at prices that defy competition. Note why this bit is superior to many others.

The large receptacle in the spiral is so arranged as to hold the chip back from the wall of the hole, and force it up and directly out, thus making it impossible to choke and easily turned by the operator. It is a rapid cutter, because it has a double threaded screw point, put on by a machine specially designed for that purpose, which causes the point to cut its way into wood, and thus obtain a firmer hold. In quality of steel, workmanship and style of tool it has no equal.

SMITH, LYON & FIELD,
WHOLESALE HARDWARE,

139 DUANE STREET.

NEW YORK CITY.

THE AMERICAN AXE AND TOOL CO.,

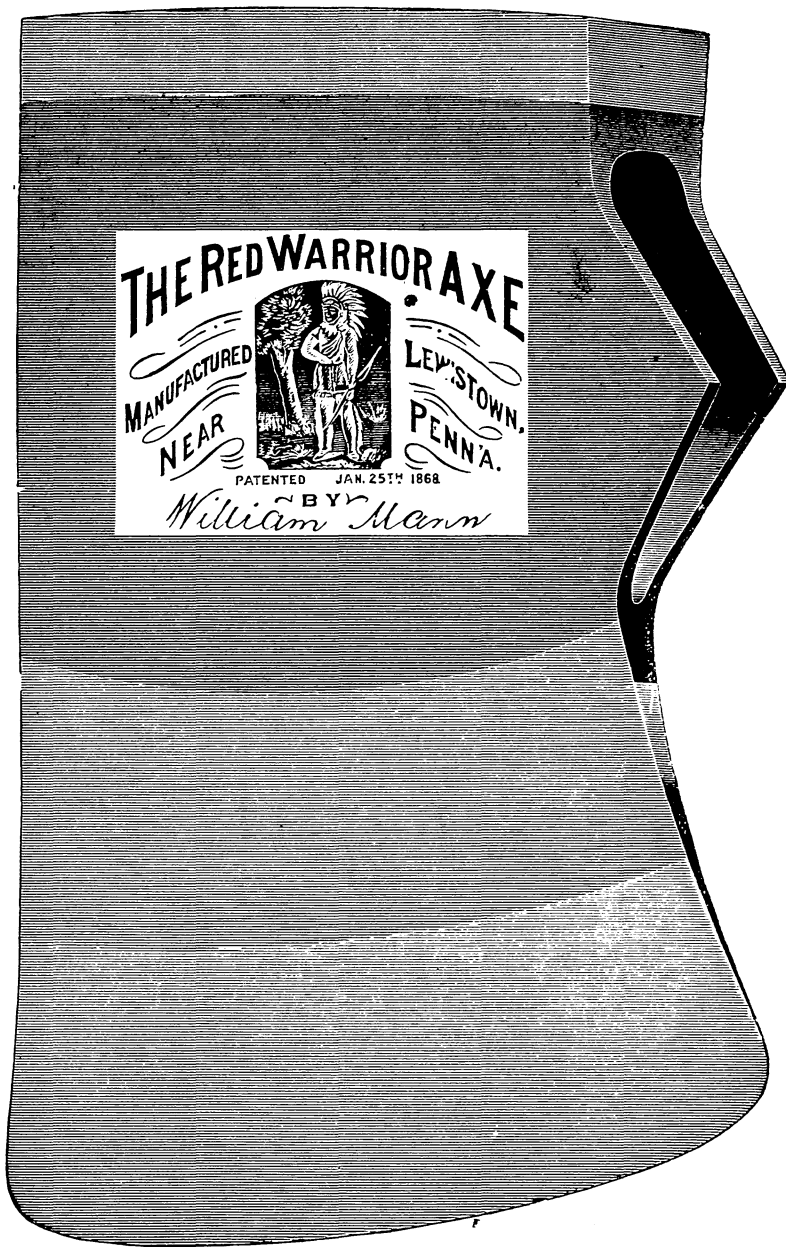
STEWART BUILDING, Rooms 63 to 67,
280 Broadway, - - - **NEW YORK.**

Manufacturers of

BLOOD, HUNT, LIPPINCOTT, RED WARRIOR, MANN, HURD, PEERLESS, JAMESTOWN,
ROMER, FRANCIS, SHARPS, UNDERHILL, STEWART,

Brands of

AXES, HATCHETS, BROAD AXES and ADZES, also "Blood's" Champion and
"Hubbard's" Diamond Blade SCYTHES.



Grass Hooks, Corn Knives, Bush Hooks, Planters' Eye Hoes, Ice Axes, Ice Hatchets and
Firemen's Axes, Wood Chisels, Picks, Mattocks, Brick Hammers, Box Openers, Ice Chisels, Butchers'
Handled Axes, Meat Hatchets.

ALWAYS IN STOCK: Best Leading Brands of Axes and Edge Tools. Cheap Handled
Axes, Medium Grade Axes. Boys' and Hunters' Axes. **Job Lots of Axes, all Grades
and Patterns.**

ADDRESS ALL CORRESPONDENCE TO NEW YORK OFFICE.

Warranted Better than the Best ENGLISH ANVIL

Face in one piece of BEST TOOL CAST
STEEL, PERFECTLY WELDED, per-
fectly true, of hardest temper, and never
to come off or "settle." Horn of tough
untempered steel, never to break or bend.
Only Anvil made in the United States fully
warranted as above.

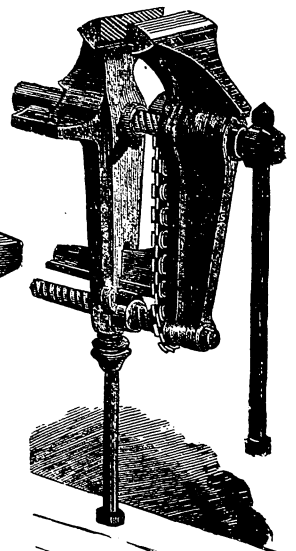
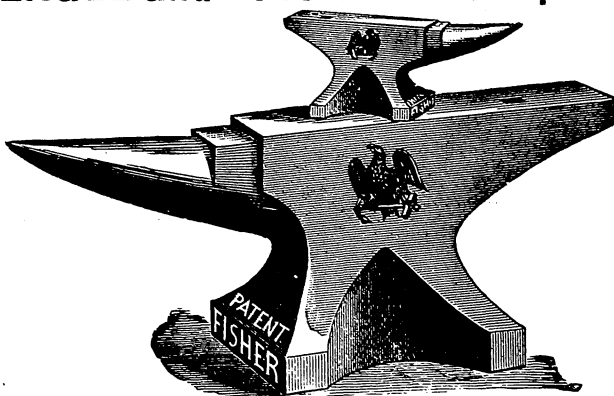
FISHER DOUBLE-SCREW VISE

IS FULLY WARRANTED STRONGER
THAN ANY OTHER LEG VISE, AND
ALWAYS PARALLEL. Is the best Vise
for Machine Shops and Blacksmiths, and
for all heavy work. ACCURATE AND
DURABLE. Send for Circular.

ESTABLISHED 1843.
MORE THAN 200 DIFFERENT PATTERNS.

None Genuine without our Trade-Mark.

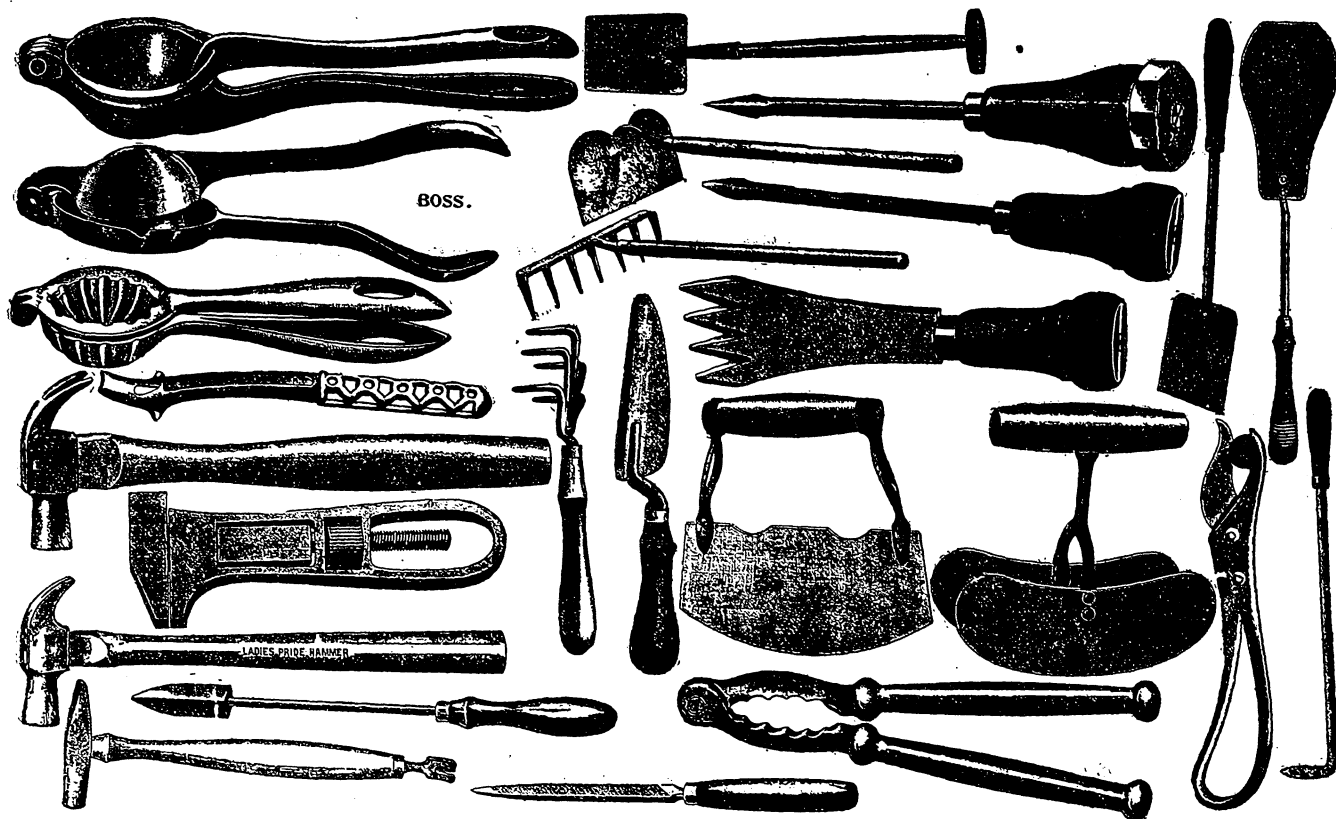
EAGLE and "FISHER" Stamp.



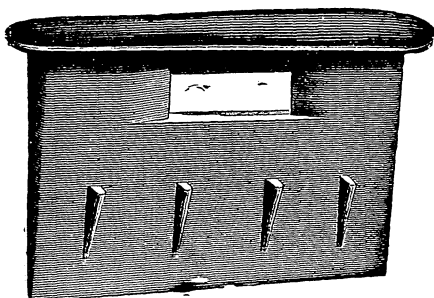
EAGLE ANVIL WORKS, - Trenton, N. J.

Sold in New York by our agents, J. C. McCarty & Co., 97 Chambers St., The Russell & Erwin Mfg. Co.,
45 Chambers St.

=: EDWIN HILLS, =:
Manufacturer of HARDWARE SPECIALTIES,
 PLAINVILLE, - - - CONN.



— SEND FOR CATALOGUE AND PRICE-LIST. —

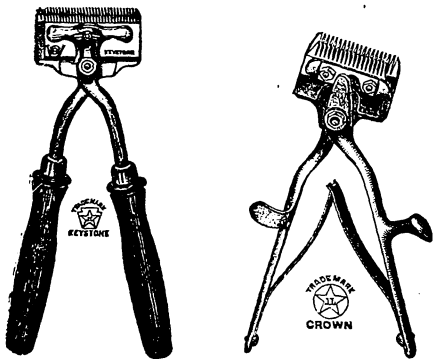


I still manufacture and sell the above
 axe wedge, which has more practical
 merit than any other thus far made.

F. V. WOOSTER,

66 BEVERLY STREET, BOSTON.

**IF YOU ARE INTERESTED IN
 CLIPPERS**



For HORSEMEN OR BARBERS
 Send Postal Card for our new Illustrated
 Catalogue.

JESSE LEE & SON,
 37 SO. FOURTH ST., PHILADELPHIA.



C. M. DUNLAP,

MANUFACTURER OF A LARGE VARIETY OF SUPERIOR QUALITY HOUSEKEEPER'S
 HARDWARE AND GARDEN TOOLS.

ILLUSTRATED CATALOGUE AND PRICE LISTS TO TRADE.

P. O. ADDRESS . . . BOX 2703 NEW YORK.

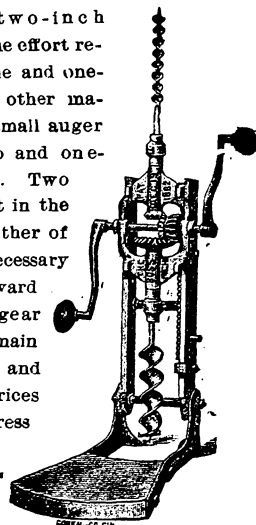


The Boss 2-speed Boring Machine.

Will operate a two-inch auger with the same effort required in using one and one-half inch in any other machine, and for the small auger have a speed two and one-half times faster. Two augers may be kept in the machine, to use either of which it is only necessary to point it downward by first taking the gear frame out of main frame, inverting and replacing it. For prices and discounts address

Buckeye Mfg. Co.

Union City, Ind.



CARY'S METAL STRAP,

PATENTED IN ALL COUNTRIES.

A SUBSTITUTE FOR

STRAP IRON AND WOOD STRAPS,

— FOR —

Binding Packing
Cases, Crates, etc.

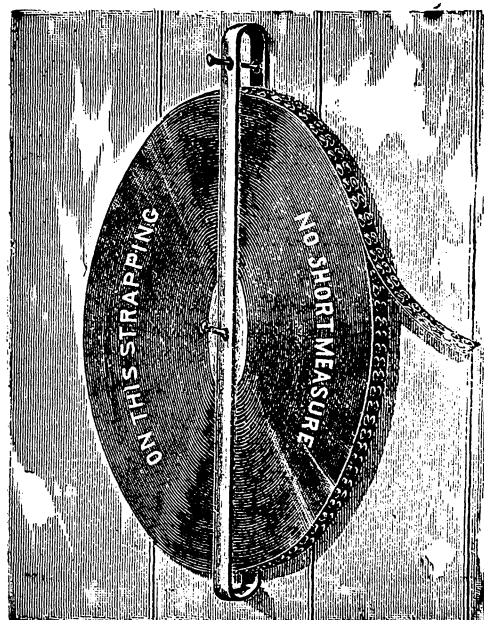
Put up in Coils of 300 Feet in
Length and Packed in Cases
Containing 20 Reels Each.

Made in different widths of a Soft
Steel through which nails can be
readily driven without the necessity
of first punching holes for same.

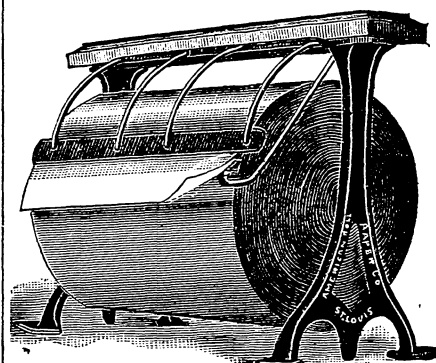
SAVES TIME AND WASTE.

CARY MANUFACTURING CO.,

5 to 9 Elm Street, NEW YORK.



SHOWING REEL HUNG UP READY FOR USE.



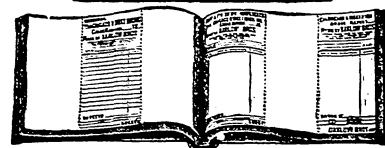
THE ECONOMIC HOPKING ROLL PAPER CUTTER.

Made in all sizes, 6 to 36 inches, at \$1.50 each
Japan and Hardwood Finish.

Made by the

American Roll Paper Co.,
St. Louis, Mo.

"DOST THOU LOVE LIFE?
THEN DO NOT SQUANDER
TIME
FOR THAT'S THE STUFF
LIFE IS MADE OF"



SAVE TIME TROUBLE & CASH
BY USING
BARLOW'S PAT. MANIFOLD
SHIPPING BLANKS
BARLOW BROS. GRAND RAPIDS, MICH.

HIGH GRADE AXES AND TOOLS.

DOUBLE BIT AXES. CARPENTERS' ADZES,
SINGLE BIT AXES. MINING PICKS,
BROAD-AXES, MACHINE KNIVES,
HAND-AXES, BARK SPUDS.

We make all patterns and styles of Axes, including PEELING
AXES, RAFTING AXES, BOYS' AXES, Etc., Etc. Our "BLACK
EAGLE" AXE is made by a Chemical Process, known only to
us, and never fails in frozen or knotty timber.

STANDARD AXE & TOOL WORKS,
RIDGWAY, PA., U. S. A.



HENRY'S
GRAPE SHEARS

Increased demand and increased facilities for production enable us to make lower
prices than ever before. Holds firmly anything it cuts and can be instantly released by
the operator. Samples by mail to the trade at wholesale prices and postage.

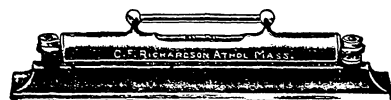
BEST MATERIAL. WELL MADE. CHEAP.

The J. T. HENRY MFG. CO. Hamden Conn., U. S. A.

NEW ADJUSTABLE BENCH LEVEL.

WITH GROUND AND GRADUATED VIAL.

4-6 and 8 inch.



Three Sizes.

MANUFACTURED BY

C. F. RICHARDSON & SON,

ATHOL, MASS.

Your Stock of Oilstones and Razor Hones

Is low, but don't think of buying till you have learned our prices.

We undoubtedly have the best assorted stock of

**Belgian and German Razor Hones in America,
AND WE ARE GOING TO SELL THEM.**

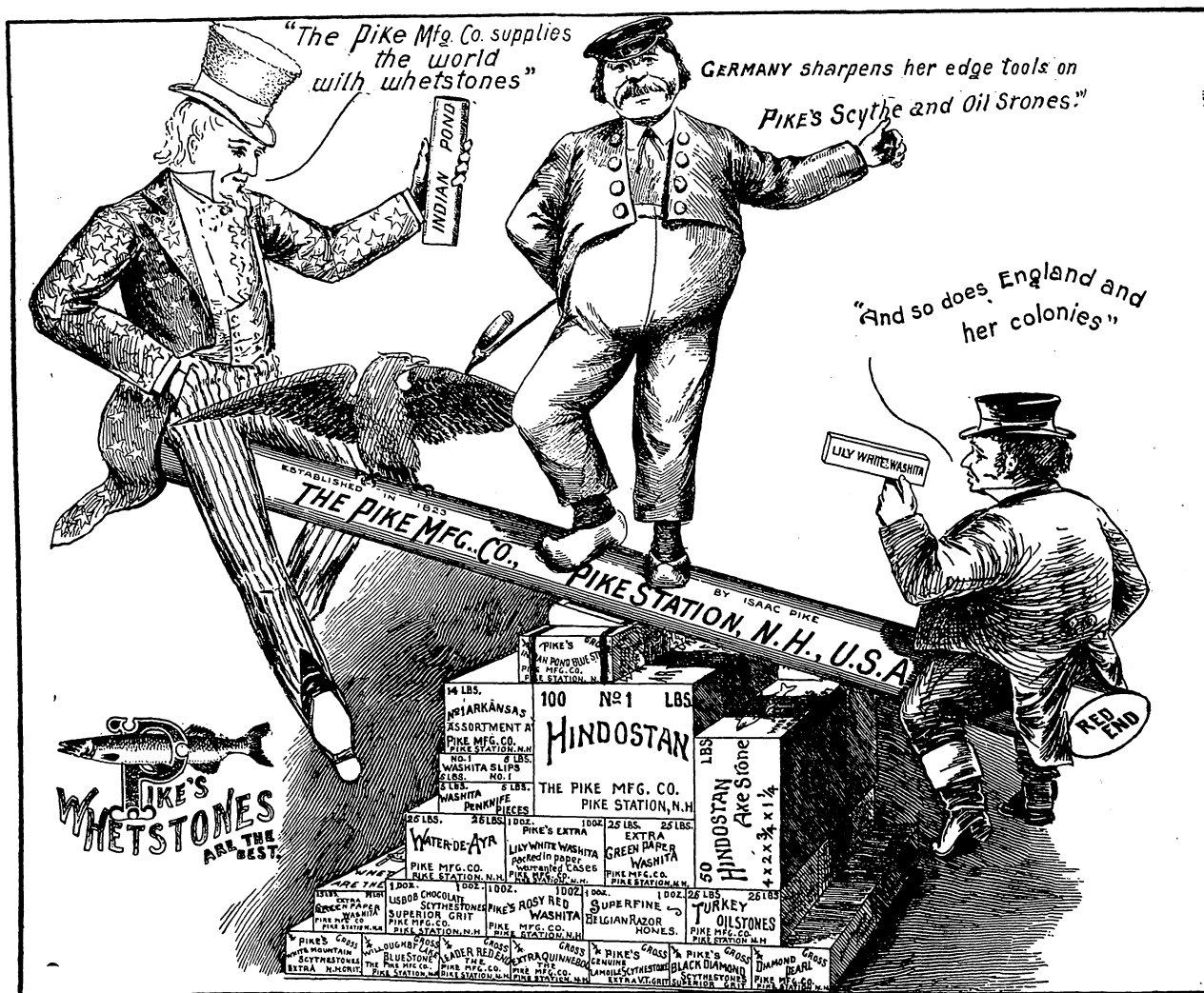
The same is also true of our stock of

Washita and Arkansas Oilstones, Hindostan, Turkey, Scotch, Water-of-Ayr, Sandstone, Etc.

An Everlasting Edge is imparted to a tool by the use of **PIKE'S**

LILY WHITE WASHITA,

"The Best Oilstone in the World."

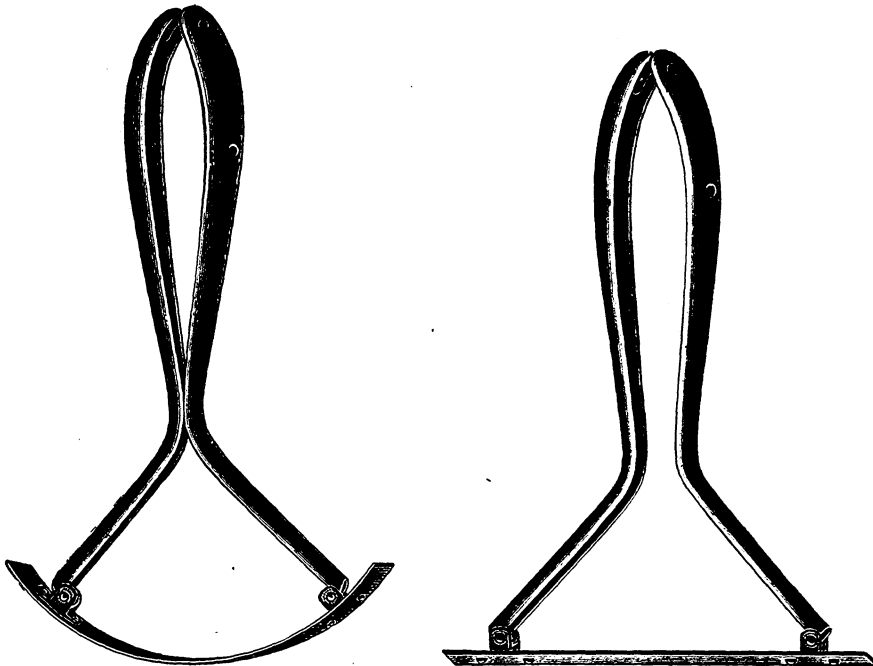


THE PIKE MFG. CO.,

-

PIKE STATION, N. H.

The Flexible POT AND KETTLE CLEANER.



NOTHING LIKE IT EVER INVENTED!!

It takes the lead, and already *Unscrupulous Persons are Trying to Imitate it.*

The blade being flexible will conform to any surface necessary to be cleaned. Write for prices.

THE UNSINGER MFG. CO. Fremont, Ohio.

ARCTIC ICE DOGS.

FIG. 1.

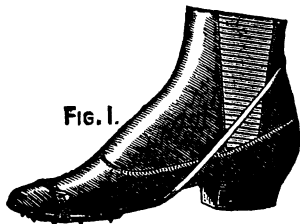
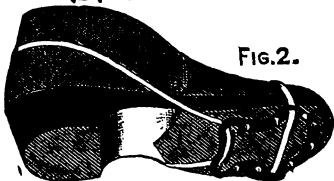


FIG. 2.

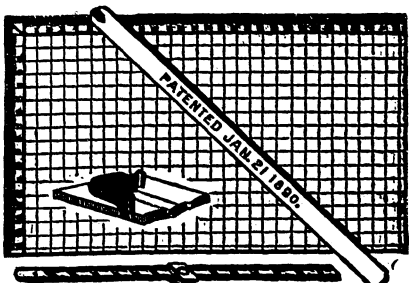


These Ice Dogs, or Creepers, designed to secure safe footing on slippery pavements, are the simplest and best ever invented. They consist of a very light, malleable casting of the best quality of iron, fitted for the sole of the shoe and fastened to the foot by means of a toe-strap and an endless elastic band drawn high over the heel, thus holding the dog to its place, and being easy of adjustment, is very quickly put on or taken off.

There are two sizes, for ladies and gentlemen respectively, and the peculiar adjustment attaches them equally well to boots, shoes or rubbers, without difficulty or delay. Retail at 50c. per pair. Liberal discount to dealers.

PATENTED AND SOLD BY

GEORGE A. WALLER,
SENECA FALLS, N. Y.



The Canton Glass Board.

Cuts any Fraction of an inch by Eighths.

Unequaled for accuracy and quick work in cutting square or at any angle. Saves breakages, &c.

—ALSO—

IMPROVED TRAMMEL RULE for Cutting Circles
From 3 inches up to 48 inches, Segments, Gothic Shapes, &c.

Send for Circular.

The Canton Saw Co., Canton, Ohio.

THE CLARK MFG. CO.,

Blind Hinges, Gate Hinges, Door Butts,
And other **HARDWARE SPECIALTIES**
BUFFALO, N. Y.

M

PHILLIPS SCREENS

Are Reliable.

DO YOU USE

LEATHER PARTS,

Straps, Washers, or Special Shapes in
Leather, hand or machine sewed
Leather Work of any description,

Skate Straps or Mountings?

Write for Estimates, mentioning this paper, to

J. FRANK GREENE & CO.,
276 Water and 14 Dover Sts., NEW YORK.

JOHN LOYD,

Machine Knives, Shear Blades,
Presses and Dies.

Nos. 558 to 562 Water Street, New York.

You ought to.

A GREAT many merchants are using
Ladd's Discount Book.

Every day adds to the number of those who highly esteem this valuable work. Very many people both in America and abroad have commended it highly as a time-saver and money-earner. It is positively

Accurate, Saving many times its cost in preventing errors.

Rapid, = = Saving much valuable time, and "Time is Money."

Practical, As proved by its constant use by those who would not now do without it.

The cost is small, the book will last for years, you can depend upon the results without proving.

A great many bright people are using LADD'S DISCOUNT BOOK, and

You ought to.

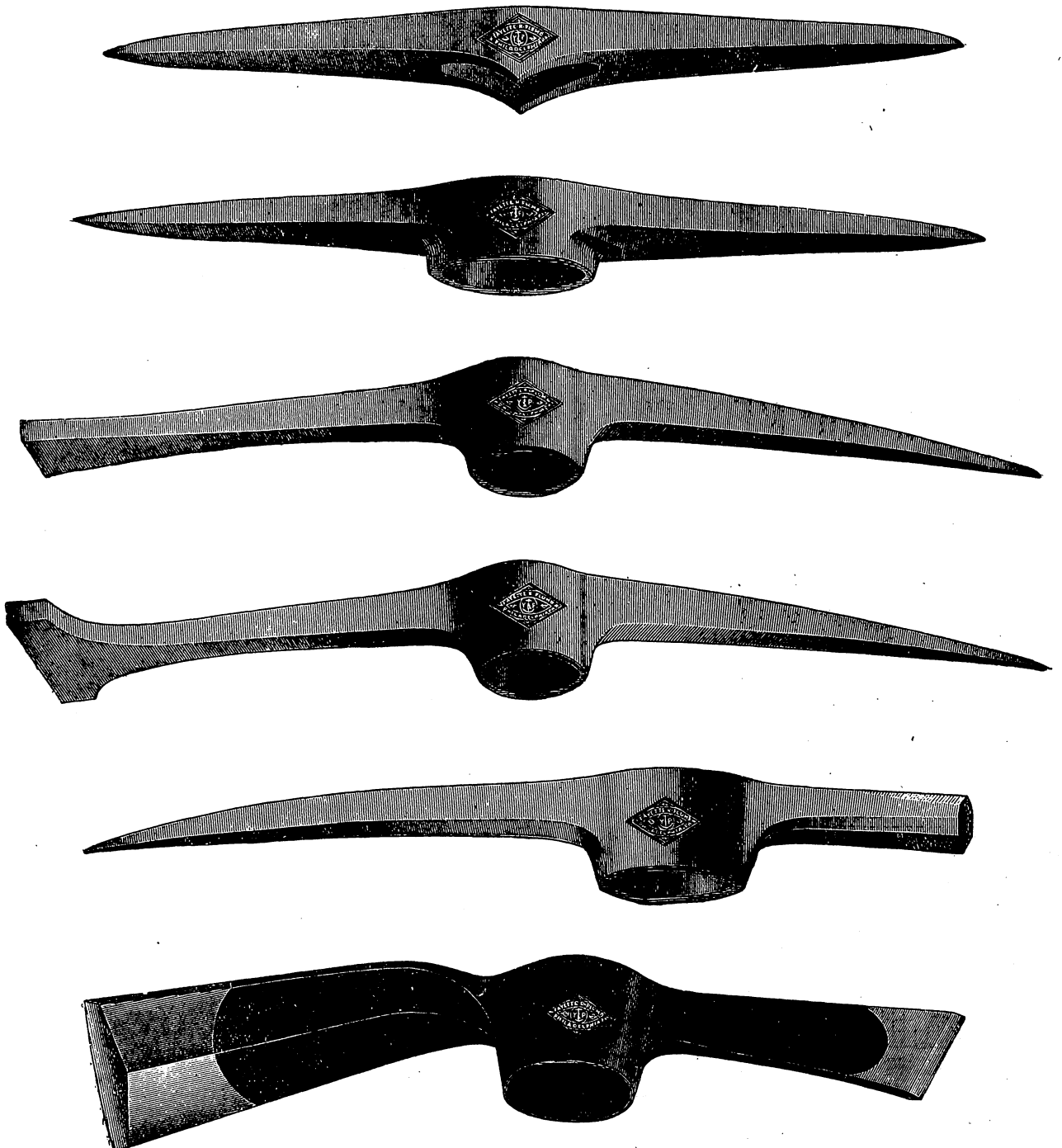
Regular Edition, \$3.00 } Sent postpaid
Double Indexed, 4.00 } upon receipt
of price by

DAVID WILLIAMS,

Publisher and Bookseller,

96-102 Reade Street, - New York.

Fayette R. Plumb,
MANUFACTURER OF
Edge Tools, Hammers and Sledges,
Railroad, Miners' and Blacksmiths' Tools.
PICKS, MATTOCKS and GRUB HOES.



PHILADELPHIA, PA., U. S. A.

PHILLIPS SCREENS

Are Reliable.

YOU will remember that last season there was a great scarcity of Wire Cloth, of Window and Door Screens and of all Screen goods.

In the hurry and rush many very poor goods were marketed. This condition of things was partially owing to the delay of buyers in placing specifications.

Assuming that you are able to profit from experience, we think

you will take it kindly and perhaps act on our suggestion that

NOW IS THE BEST TIME TO BUY SCREEN GOODS.

Aside from the fact that, notwithstanding his former experience, now is the time when the manufacturer rushes around, crazy to get orders at any price, and in consequence better prices are obtainable now than later, early specifications enable the maker of season goods to secure material and to shape his product to fit his orders.

We did not "lose our head" last fall. Sufficient orders were obtained at fair prices to enable us to run our factory to its full capacity, 4,000 to 5,000 screens per day. There was no rush and hurry, except in our department of "Screens to Order," and for a short time in our Screen Door Department. Our customers received good goods in reasonable time.

On account of the hard times and for other reasons, some screen makers will cut down their product for next year. In anticipation of the usual shortage, we have bought more largely than ever of lumber and wire cloth, a very large share of which is already in stock at the factory, which has been running since September 15th.

Buyers of Phillips Screens will secure for the coming season a well known, reliable article and a reasonable certainty of getting goods on time if specified for early.

SOLD BY THE BETTER CLASS OF JOBBERS.

Phillips Screens

FOR DOORS AND WINDOWS, ARE WELL
MADE, FROM GOOD MATERIALS BY

A. J. Phillips & Co., Fenton, Mich.

No. 4 RATTAN MIXED BROOM.

The Best Warehouse, Stable, Shop, Factory and Railroad Broom in the Market.

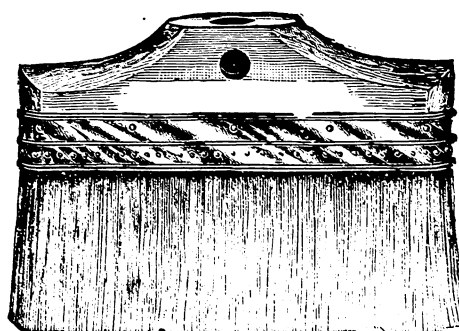
Made of Broom Corn and Rattan Reed mixed together, flat in shape, with an iron band, as shown in the cut, making it solid, substantial, and stiff, for handling the heaviest dirt. Will last longer than any other similar broom.

Brooms and Brushes for Railroad Shops, Warehouses, Street, Stable, Bloom. Chill, Casting and Moulding purposes a specialty. Write for prices.

JOSEPH LAY & CO., RIDGEVILLE, IND.

BRUSHES

FOR THE



Hardware Trade,

Whitewash, Horse, Paint, Window,
Shoe,

And Every Variety of Brushes and

Wire Goods.

Close prices and prompt shipments. Get samples and catalogue for the asking.

Cincinnati Mfg. Co., Cincinnati, O.

OLSEN'S AUTOMATIC

King of Corn Poppers, Peanut and Coffee Roasters.

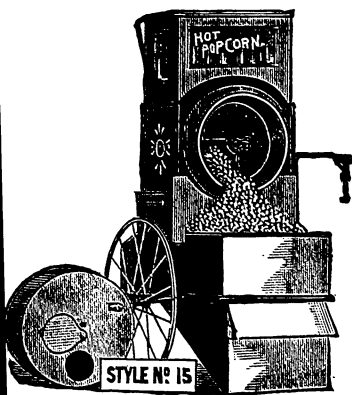
The greatest wheel of fortune out, for any person 12 years and upward; \$1.00 to \$50.00 profit per day; 1500 now in use,

Guaranteed to have no equal. Agents wanted.

Write for illustrated catalogue and prices on Pop Corn, Shelled or on Cob, Balls, Bricks and other supplies.

A. B. OLSEN, Sole Mfr.,

218-220 E. Mo. Ave., - - Kansas City, Mo.



American Stamping Co.,

Manufacturers of

All Kinds of Tinware and Sheet
Metal Goods.

N. Y. Office and Salesroom, 104 & 106 John St.
Factory, 103 to 119 N. 3d St., Brooklyn, E. D., N. Y.

P. J. Conroy & Co.,

Paschall, PHILADELPHIA.

"CONROY"

Refrigerator Door

Fasteners

Have rapidly supplanted all
others.

Refrigerator Trimings.



Pat. Dec. 15, '85



The Great Copper Trusts are Broken.



The *exorbitant* and *ruinous* figure to which copper had been driven by the trust caused us to desist from manufacturing the *Adjustable Soldering Copper Irons* for the time being.

The demand for the goods from old customers, and the many orders we were thus unable to fill, is good evidence that it is the *only soldering iron* that meets the demands of the *Tinsmith* and *Plumber*.

With new and improved machinery we are once more in a position to receive and fill orders with the *best soldering iron in the market*. It is a complete tool in every respect, and can be as easily adjusted at any angle while hot as cold. The handle can be used indefinitely, as when the copper is worn out it can be *replaced* in the *same handle*, making the iron as good as new and at about *half the cost* of the ordinary soldering iron. These *soldering irons*, like our other goods, are guaranteed *first class* in every respect, and if for any reason they are not satisfactory or do not meet with ready sale, the purchaser can return them and we will replace with other goods of our make or refund the money.

Thus the dealer runs no risk in handling these goods, as we assume it all ourselves.

FOR SALE BY ALL

General Hardware and Plumbers' Supply Houses

AT MANUFACTURERS' PRICES.

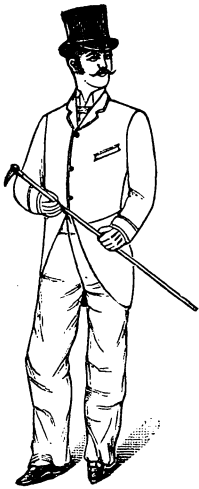
COVERT MFG. CO.,

WEST TROY, N. Y.

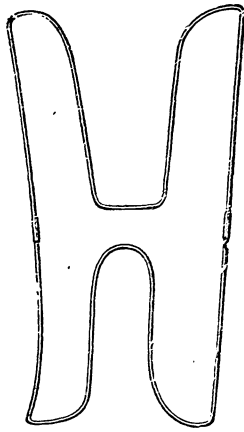



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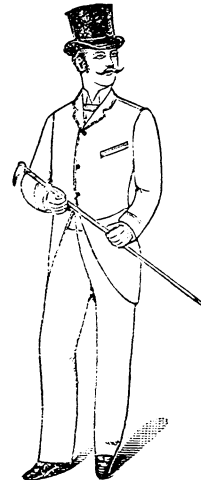
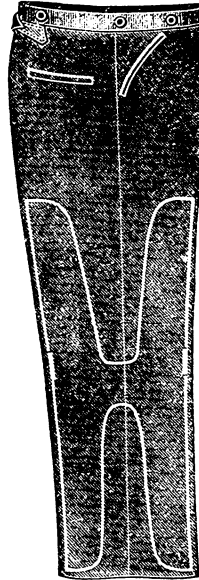
COVERT PANTS STRETCHER.



Before Using.

Stretcher Ready
for Use

Patented.



After Using.

GENTLEMEN using the Covert "Pants Stretcher" will find that their pantaloons will be restored to their original shape and length.

It removes all **WRINKLES** and **BAGGING AT THE KNEES**, and gives them the appearance of having just left the tailor's hands.

It is also very useful for holding the pants in a convenient position for brushing and cleaning.

The invention is simplicity itself, and cannot get out of order, and can be adjusted in the pants in a few seconds.

It adapts itself to the gradual yielding of the fabric, and cannot injure the garment.

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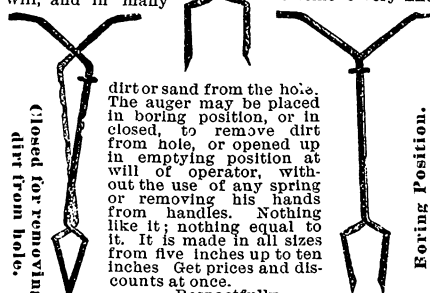
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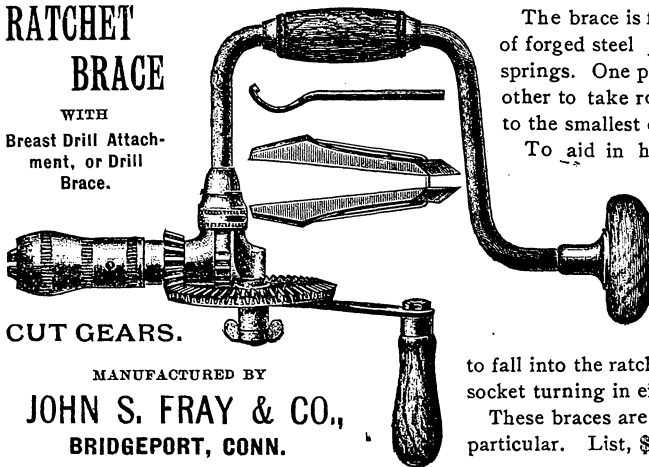
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Breast Drill Attach-
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The brace is furnished with two sets of forged steel jaws having our patent springs. One pair for ordinary bits; the other to take round shank drills down to the smallest ordinary size.

To aid in holding firmly the round shank drills, we furnish a small sleeve wrench, which can be used advantageously, the socket being instantly locked by turning the ring to allow both pawls to fall into the ratchet, thus preventing the socket turning in either direction. These braces are fully guaranteed in every particular. List, \$36 per doz.

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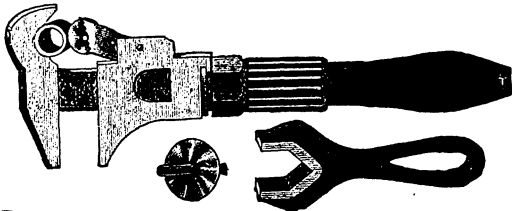
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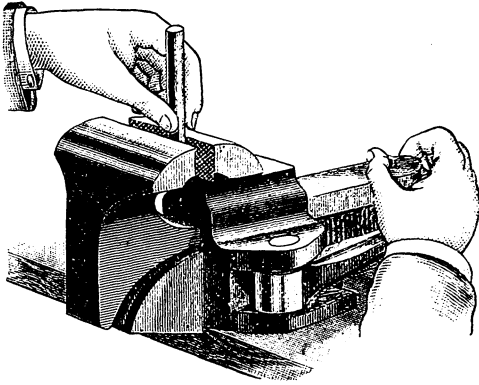
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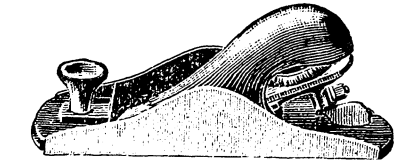
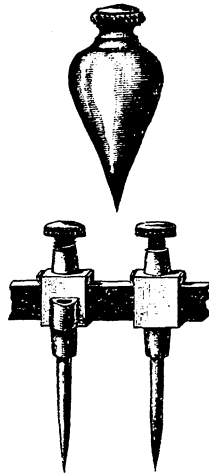
HIGH QUALITY TOOLS



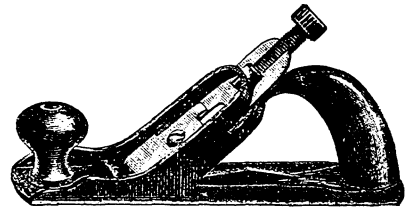
Donohue's Pat. Engineers' Wrenches,
Short or Long Sleeve Nuts, and
with Pipe Cutter.



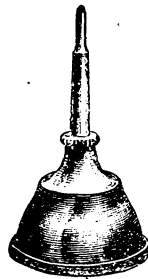
Stephens' Patent Vises, Quick Adjust-
ing Cam and Toggle-Joint, Sta-
tionary or Swivel Base.



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Challenge Iron Planes.
Simplicity of Construction.



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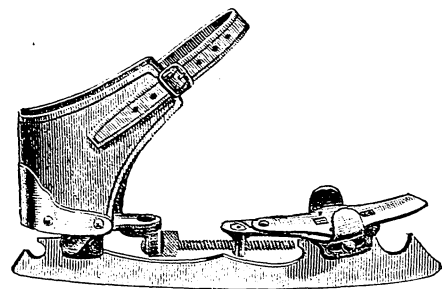
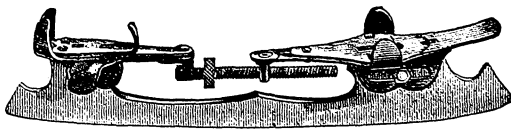
TOWER & LYON, Manufacturers, - - 95 Chambers St., New York.

ICE SKATES

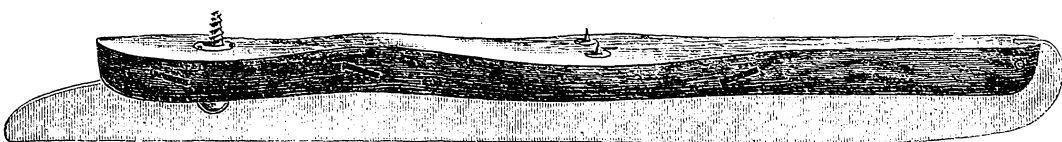
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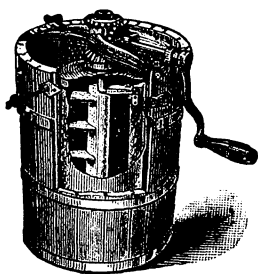
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Sundry Ice-Cream
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ONE TUBE WILL LAST A YEAR
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WITH SPOKE GRIP ATTACHMENT.

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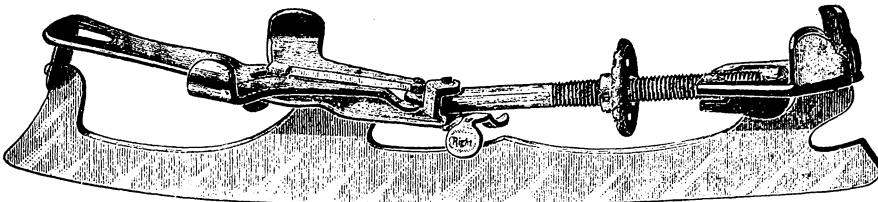
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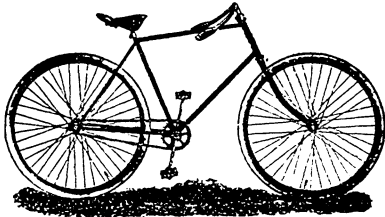


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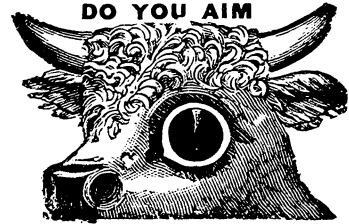
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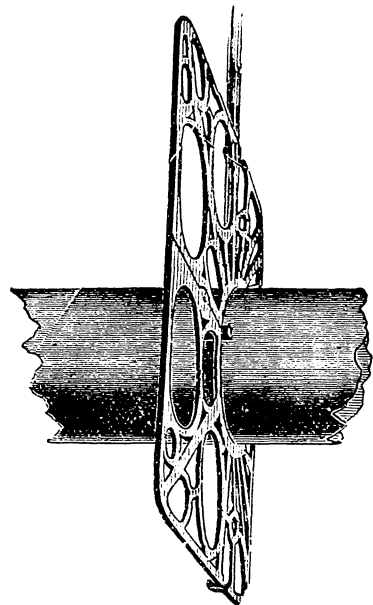
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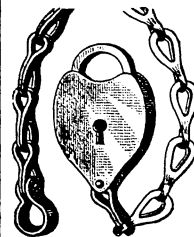
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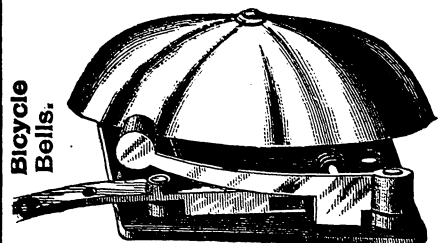
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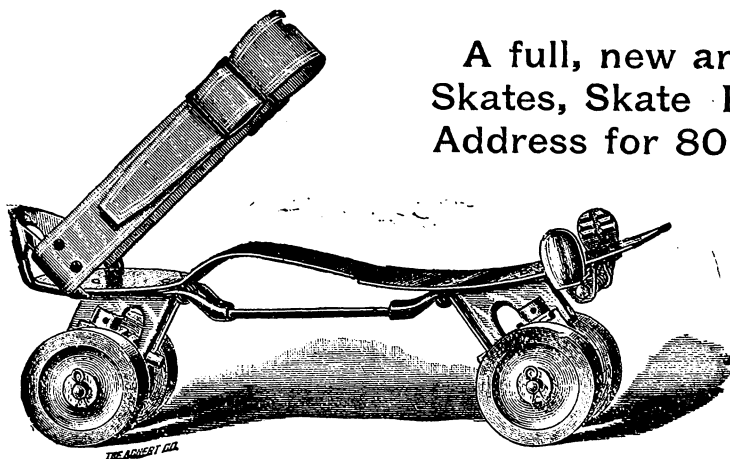
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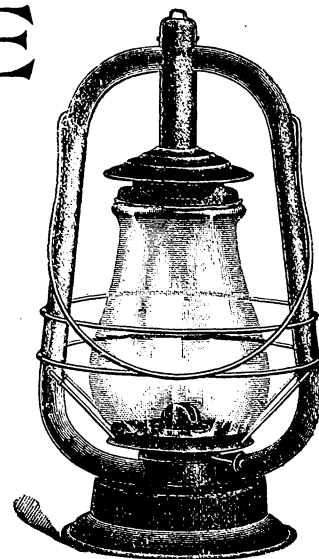


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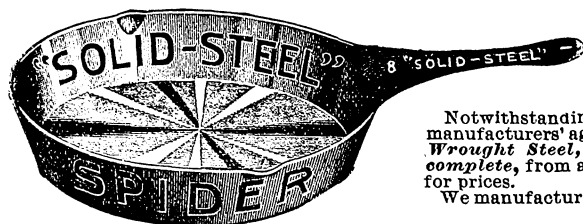
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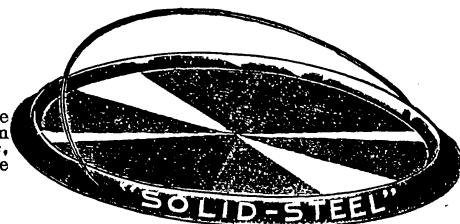
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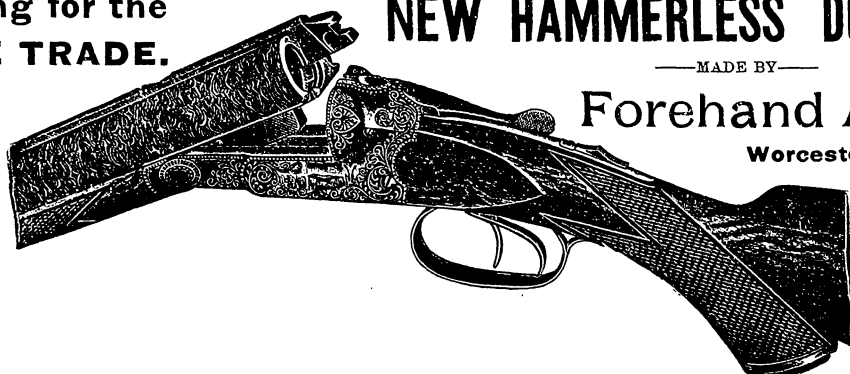
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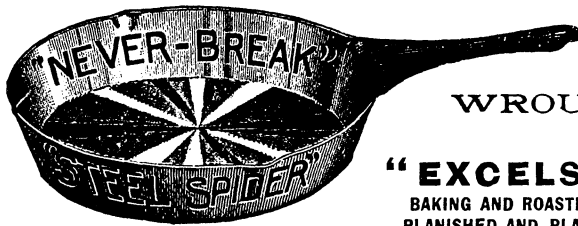
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MIRROR POLISHED-TINNED-PORCELAINED.

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COOKERS, COFFEE POTS AND
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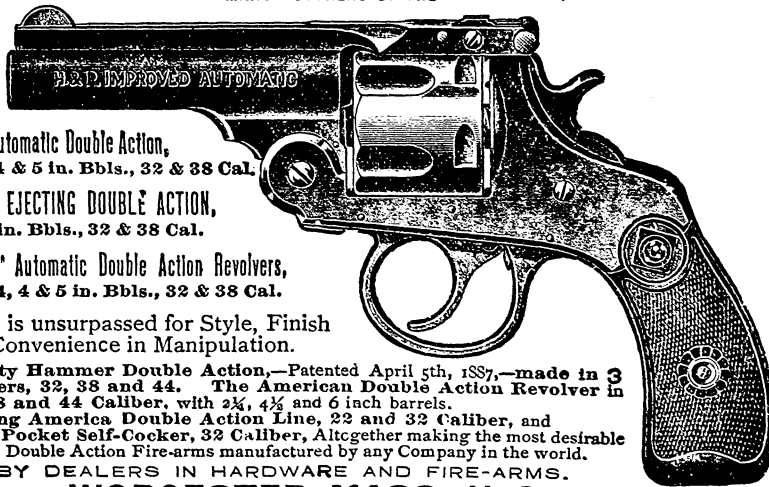
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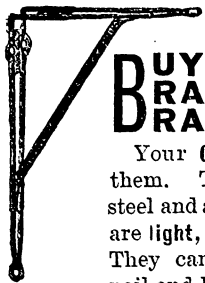
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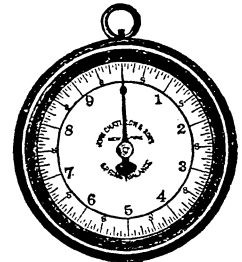
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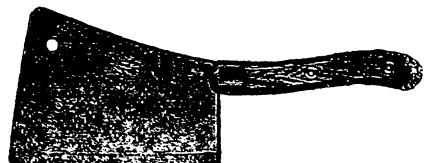
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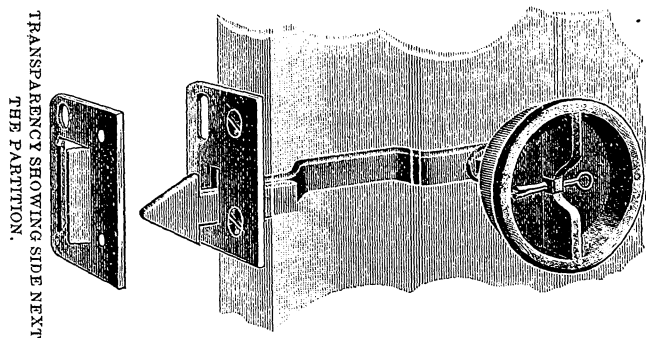
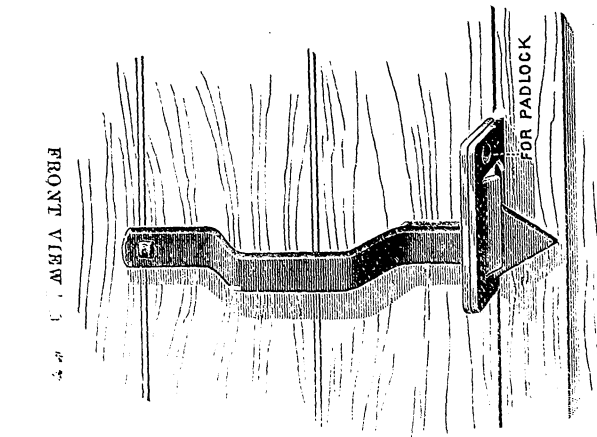
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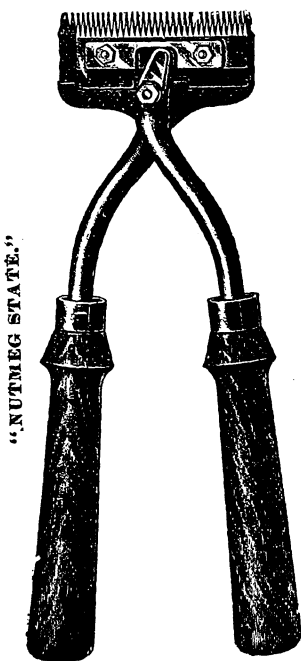
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22-INCH BARREL.
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TAKEN APART IN TEN SECONDS.

IT IS SIMPLY IMPOSSIBLE
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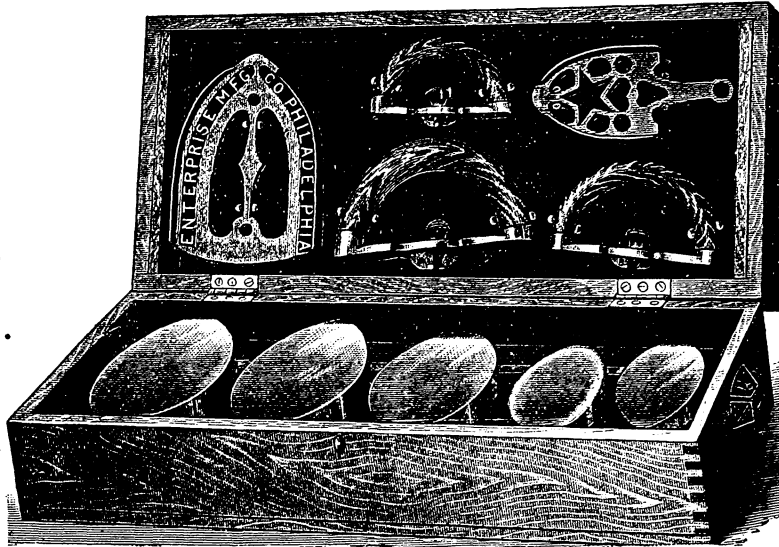
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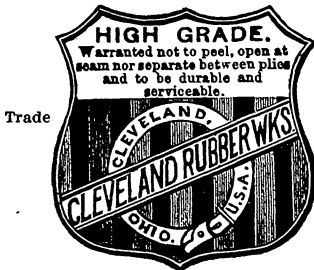
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"BELT BROKE AGAIN!"

"See here, Mr. Foreman, if you don't have fewer stoppages I'll——"
"Stop, Mr. Proprietor, the fault is yours. Quit buying belts that crack, peel, open between plies, stretch and break, and I'll give you a smooth run. You think it economy to buy cheap belts from Worthless & Co. Why! the time lost and trouble and annoyance caused by shut-downs would pay the difference between good and bad belts ten times over. Why don't you buy Cleveland's 'Shield High Grade,' sold by Reliable & Co.? It has an established reputation, has been thoroughly tested, and is in use in all the large mills and elevators here. You take no chances on it. Besides, a strong warrantee is indelibly branded upon it, such as no manufacturer would dare put on a poor belt. You remember that threshing machineman, whose engine we repaired, said he had a Cleveland High Grade Belt in use over five years, and if it will stand such severe work, it certainly will ours."



Trade

Mark.

LABEL INDELIBLY STAMPED ON
EVERY 30 FEET OF BELT.

We are the only manufacturers who indelibly stamp a warrantee on each and every belt (see copy of label) and it remains as long as the belt lasts; and who give a written guarantee (see fac-simile). Our threshing machine belts have made a wonderful record, and our endless belts have given splendid service, the splice being as strong as the solid part of the belt. Suction Hose for Portable Engines and all other purposes.

We Want Your Trade.
Send for 60-page Catalog.
Write for Prices and Samples.

CLEVELAND RUBBER WORKS

OF THE MECHANICAL RUBBER CO., CLEVELAND, OHIO.

GUARANTEE.

We Guarantee our "Shield High Grade" Belt to be made of best long staple, 30 & 32-oz. cotton duck; To be the most durable, because it is made of best materials, by special machinery; To be the best selling belt, because it has the best reputation, a cleaner record of long service, and because its warrantee is stronger, bolder, broader than any other, and is irrevocable, protecting both dealer and consumer. We further guarantee that, should any belt, under fair and reasonable service, fail or give out from any defect in material or manufacture, to replace same free of charge, on return to us.

Witness our hand and seal.

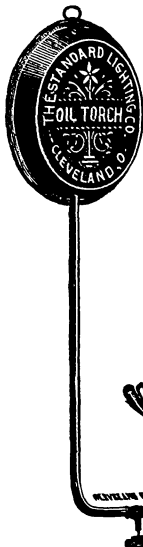


Cleveland Rubber Works

Of the Mechanical Rubber Co.

LIGHT YOUR DARK SHOPS CHEAPLY.

Give your men plenty of Light and they will do
double work.



The Wall Torch has been used for several years as a means of illumination in Mills, Foundries, Machine and Car Shops, Tunnels, Street Stands, Band Stands, Smith Shops, etc.

While there are many cheap, inferior torches made which injure the sale of a good article, and condemn the Torch in general, our "Incandescent" Wall Torches are recognized as the best, and are now in use in the largest manufacturing establishments in the country giving **PERFECT SATISFACTION**, as is evidenced by the **DUPLICATE ORDERS** we receive from year to year.

They burn 150° Coal Oil, or 74° Naphtha, requiring a different burner for each.

In ordering be careful to state which is desired.

Price, for Single Torch, complete, \$2 each.

SPECIAL PRICE QUOTED FOR QUANTITIES.

THE STANDARD LIGHTING CO.,

100 to 118 Perkins Ave., - - - - - Cleveland, Ohio,

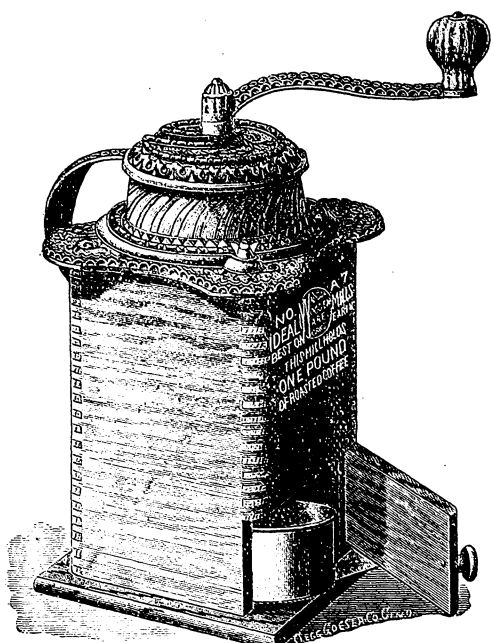
Reliable Torches are
what you want.



Made either for Oil or
Gasoline.



These Torches are particularly adapted for use in Factories, Foundries, Machine Shops, Rolling Mills, Blacksmith Shops, Warehouses, &c. They make a strong white light, are free from smoke and are not affected by wind or rain. They are convenient and portable. These Torches can be run at an expense of about one-half cent to one cent per hour, burning a bright, steady light which is ten times greater than the light of an ordinary gas burner. Write us for prices. A liberal discount given to the trade. Manufactured by **THE SCHNEIDER & TRENKAMP CO.,** Nos. 479 to 497 Case Ave., Cleveland, Ohio.

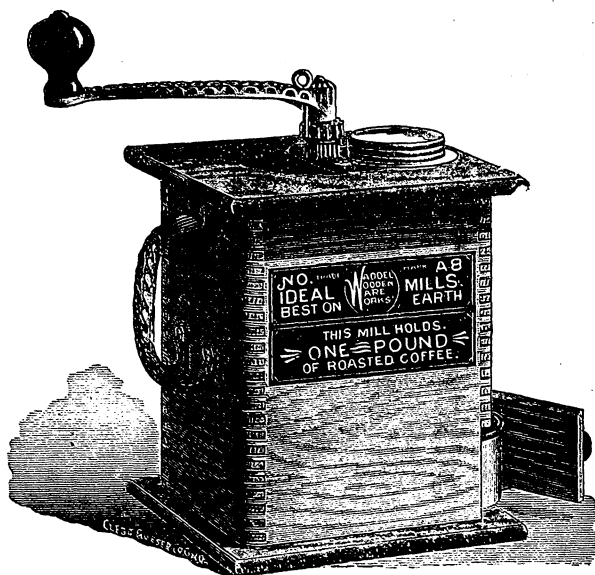


"Ideal"

Coffee Mills are fast becoming the Popular Sellers.

WHY ?

Because they Grind faster, are newer and have a better reputation. We can fit you in size and price.



WADDELL WOODEN WARE WORKS, Wholesale Manufacturers,
COFFEE MILLS, MONEY DRAWERS, ANIMAL TRAPS, &c., **GREENFIELD, OHIO.**

TWO FEATURES,
"MERIT and QUALITY,"

THAT THE
WORLD FAMOUS

Hunter Sifters



excel in. They can be used for more purposes, last longer and sell quicker than any other make. Why? Simply because the public appreciates a good article. There are others, but *Hunter's Sifters are Best.*

—ADDRESS—

The FRED J. MEYERS MFG. CO.,

COVINGTON, KY. F. J. MATTISON, Eastern Agent
NEW YORK.

The Sun Manufacturing Co.

Successors to the Jno. M. Waddell Mfg. Co.,

ARE SOLE OWNERS AND MANUFACTURERS OF

Waddell's Improved Coffee Mills,
Cathedral Gong Money Drawer and Surprise Rat Traps.
Beware of Infringements.—We will protect our Patents.

"THE 'SUN' ONLY, SHINES FOR ALL."

A New Name, A New Reputation,

A New Line of Coffee Mills

That under the SUN Brand shine as leaders.

RAPID GRINDERS that will STAND THE WEAR.

STEEL ALLOY BUHRS,

A metal of recent discovery for this purpose used solely and only by the SUN. Warranted to outwear, outgrind and outsell any Coffee Mill ever put on the market.

We Challenge a Competing Test for Rapid Grinding and Wearing Surface.

Our New Line bears the Sun Trade Mark and is labeled Steel Alloy Buhrs.

Write for Our Catalogue and New Prices.

Order a Sample Mill.

THE SUN MANUFACTURING CO.,

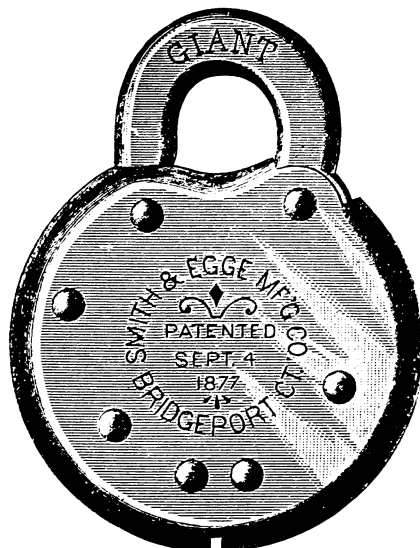
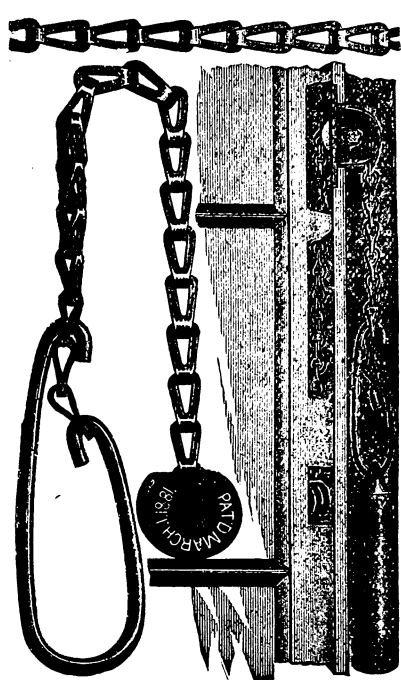
Greenfield, Ohio, U. S. A.,

MANUFACTURERS OF

Cash Registers, Money Drawers, Coffee Mills and Wooden Ware Specialties.

THE SMITH & ECCE MFG. CO.,

BRIDGEPORT, CONN.

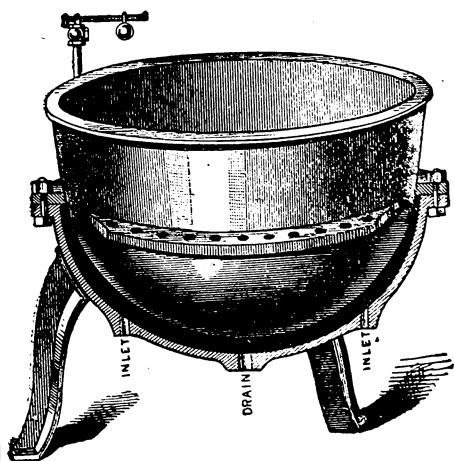


THE GIANT PADLOCK.
Centennial Award. "Superior in Every Respect."

This is one of the best selling locks in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited.

THE GIANT METAL SASH CHAIN

is a substitute for cord in hanging weights to windows. It is manufactured by us only, and by automatic machinery, patented and owned exclusively by ourselves, and whereby we secure uniformity of construction and quality. We have been to great expense in producing a metal having all the qualities and conditions requisite for making suitable chain for this purpose, and to prevent other chain of the same pattern of link and of the same general appearance, but made from an inferior metal, being offered as the same thing, we patented the word "Giant" as a Trade-Mark, as applied to either metal or chain. Trade-Mark Registered April 16, 1878, and October 22, 1878, and our metal is therefore known in the market as "Giant Metal," and our chain as "Giant Metal Sash Chain."



Jacketed Kettles.
Jacketed Kettles.
Jacketed Kettles.

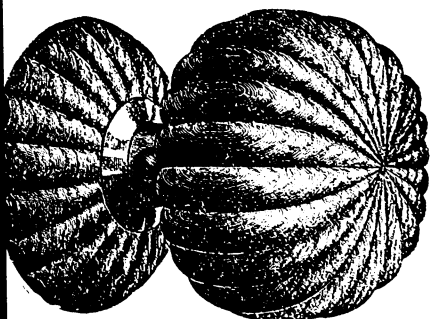
Soup Digesters.
Soup Digesters.
Soup Digesters.

Reversible Griddles.
Reversible Griddles.
Reversible Griddles.

Hollow Ware.
Hollow Ware.
Hollow Ware.

THE STUART & PETERSON CO.,
BURLINGTON, N. J., U. S. A.

BOOKS. YOU CAN OBTAIN PROMPTLY the latest work on any subject in which you are interested by addressing DAVID WILLIAMS, Publisher and bookseller, 96-102 Reade St., New York



WOOD DOOR KNOBS,
DOOR SPRINGS AND CHECKS
AND CHECKING SPRING HINGES.
NEW GOODS. NEW PRICES.
Send for New Price-List.
BARDSEY, 149 & 151 Baxte St New York.

HARDWARE DEALERS

CAN RECOMMEND THE

CHAMPION METAL WINDOW SASH CHAINS

to their customers as a reliable substitute for Sash Cords, very strong and lasting (some in daily use ten years), and gives thorough satisfaction wherever used. The patented attachments are very simple and can be applied to any window.

MANUFACTURED ONLY BY

"THOMAS MORTON,"

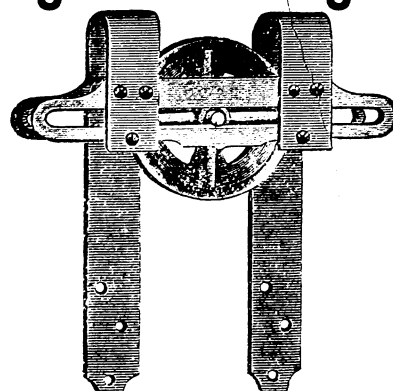
65 Elizabeth Street,

Write for Prices.

NEW YORK.

CHICAGO

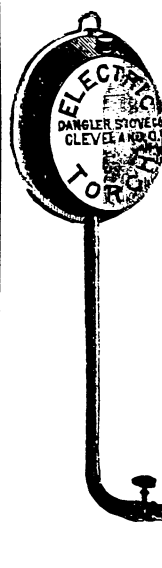
Big Twin Hanger.



Also a Complete Line of this Class of Goods.

MANUFACTURED BY

Chicago Spring Butt Co.,
Chicago, Ill.



Dangler

Electric

Torches

FOR
GASOLINE
OR
OIL.

14 JETS OF LIGHT



3 to 6
INCHES
LONG.

FOR lighting manufacturing establishments, such as Rolling Mills, Foundries, Machine Shops, Engine Rooms, &c., &c., with a convenient, portable, brilliant, steady light, and by cheaper means than by Coal Gas.

SOLE MANUFACTURERS,

The Dangler Stove & Mfg. Co.,
Cleveland, Ohio.



World's Columbian Exposition.

1893.

RUSSELL & ERWIN MANUFACTURING COMPANY

Received a Medal and the Highest Awards in the several Classes in which they entered their products for competition, as follows:

Builders' Hardware.—DEPARTMENT H, GROUP 119.

Highest Award for Excellence of construction and workmanship, Artistic order of Designs and Extensive Variety.

Door Locks of Wrought Steel—for Lightness and Strength.

Door Locks, Cylinder—Security and Simplicity.

Door Checks and Springs, "Home"—Simplicity, Efficiency and Durability.

Screws and Bolts.—DEPARTMENT H, GROUP 119.

Highest Award for Screws and Bolts made from Iron, Steel, Brass and Bronze for Wood and Metal, with Patented Helicoid Ribs on the Shanks. This feature of the Helicoid Ribs on the Shanks is the most important improvement in Screws and Bolts of recent years.

Diamond Point Steel Screws.

Kuhn's Hinge Pins for Stove Doors.

House Furnishing Goods.—DEPARTMENT H,

GROUP 119.

Highest Award for Excellence and Merit. Fire Irons and Stands, "Home" Meat Cutters and Stuffers. Hale's Meat Cutters and Stuffers.

Carpenters' Tools.—DEPARTMENT H, GROUP 119.

Highest Award for Excellence of Quality and Workmanship. Chisels, Gouges, Drawing Knives, Boring Implements (James Swan) and Steel Squares.

FACTORIES:

New Britain, Conn., and Dayton, Ohio.

WAREHOUSES:

New York, Philadelphia, Baltimore, and London, Eng.

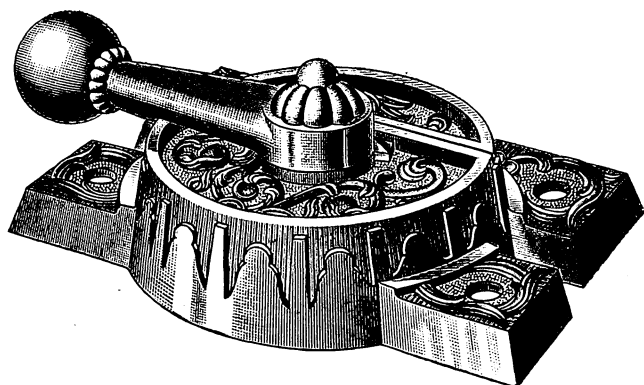
READING HARDWARE CO.

ANTIQUE COPPER PLATED ON IRON

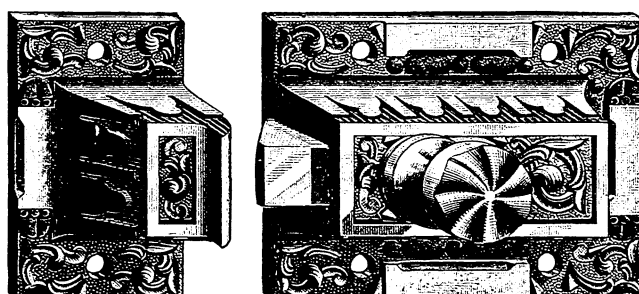
COLUMBIAN DESIGN HARDWARE

AND —

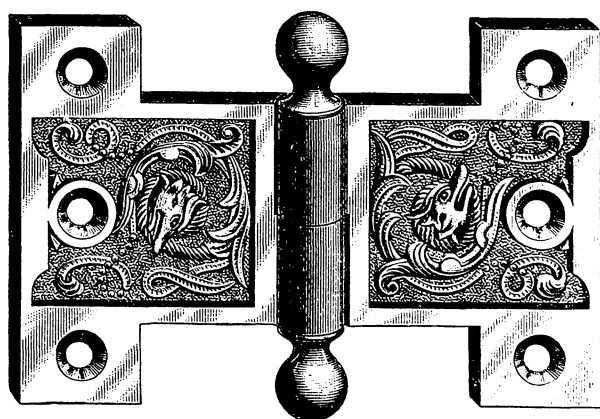
LOCK SETS,
For INSIDE DOORS.



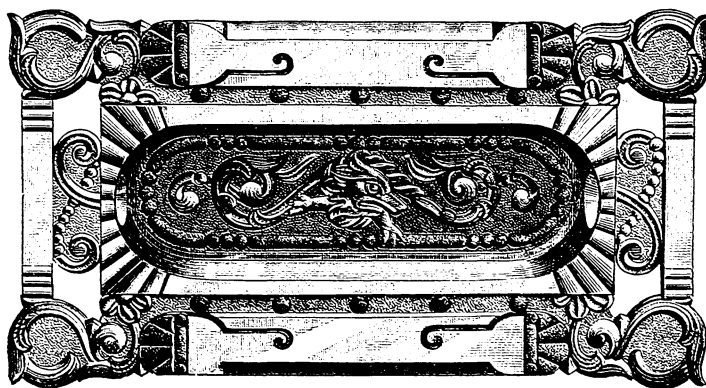
No. M 789.



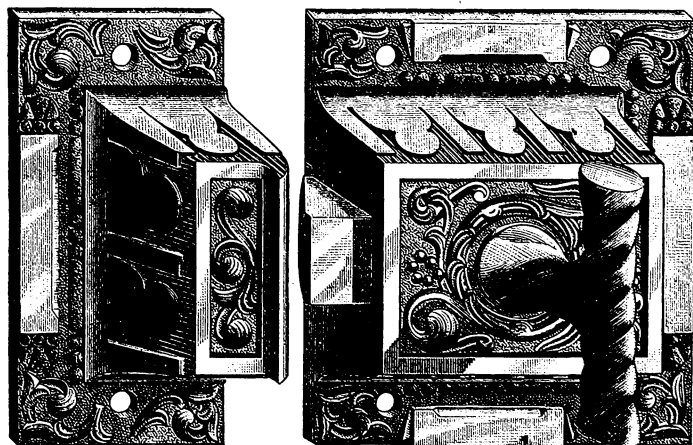
No. M 369.



No. M 297.



No. M 318.



No. M 444.

Catalogue and Price-List furnished
on application.

WAREHOUSES :

81 Reade St., NEW YORK.

514 Commerce St., PHILADELPHIA.

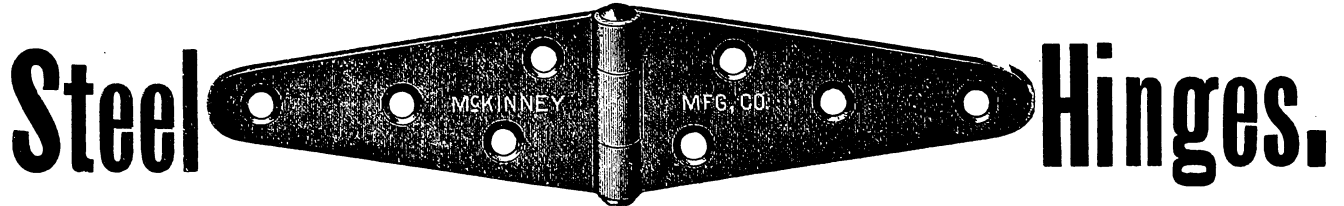
73 Wabash Avenue, CHICAGO.

Factories and Main Office: **READING, PA.**

WE CLAIM

That one pair of our Celebrated Steel Hinges will outwear two pair of the Flimsy Invention now being forced upon the attention of the trade.

McKINNEY MFG. CO., ALLEGHENY, PA.



SEND FOR LIST.

"NONE BETTER."

BARN, MILL AND FIRE DOOR HANGERS. HIGHEST AWARD

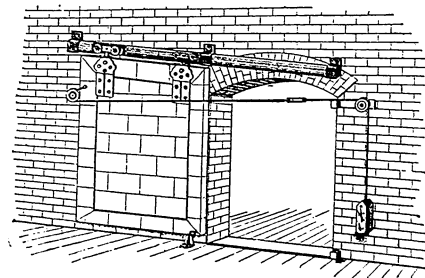
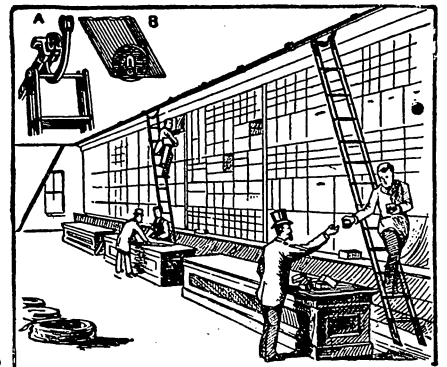
at WORLD'S FAIR, 1893,

—: ON:—

Parlor, Barn and Fire Door
Hangers.

SEND FOR CATALOGUE.

COBURN TROLLEY TRACK MFG. CO.
HOLYOKE, MASS.



Fire Door Hangers. Best in the World. Equipped with Automatic Fire Door Fittings.

We make four styles of ROLLING LADDERS to reach shelving of any height.

P. & F. CORBIN,

New Britain, Conn.

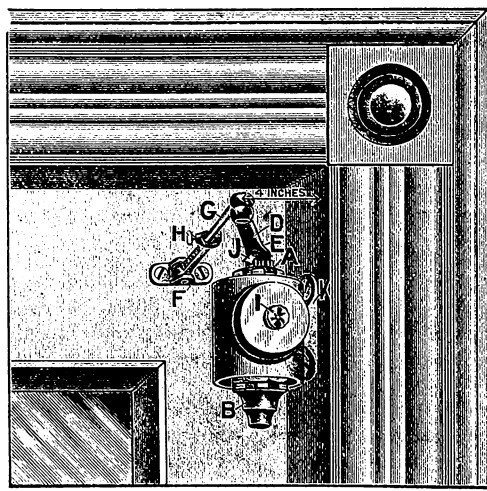
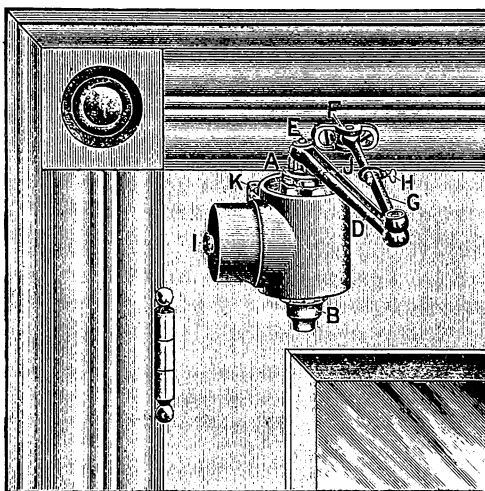
New York.

Philadelphia.

Chicago.

—) MANUFACTURERS OF (—

Easily
Adjusted
and Adapted
for all
Requirements.

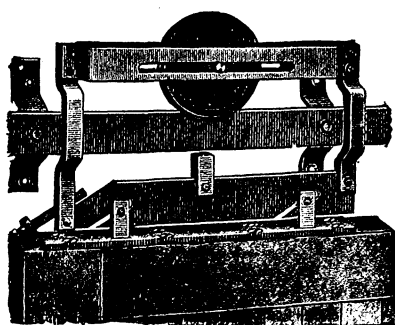


Looks Well,
Acts Well,
Wears Well.

LIQUID DOOR CHECKS AND SPRINGS,

Fine Builders' Hardware. Wood ^{AND} Machine Screws.

Catalogues and Prices Furnished on Application.



LANE'S PATENT NOISELESS STEEL PARLOR DOOR HANGER.

This Hanger is made of Steel.
The Wheel is also Steel, except the filling or tread.
The Track is of Steel—a single one only.
The Hanger is Anti-Friction.
More nearly Noiseless than any other.
Ease of adjustment.

Can be erected with half the labor others require.
Track will not swell, shrink or warp out of true.
No cutting of doors.
No matching of hardware.
Simplicity in all its parts.
Durability.

ALSO LANE BARN DOOR HANGER AND TRACK. SEND FOR CIRCULARS.

Manufactured by

LANE BROS., Poughkeepsie, N. Y.

JOHN H. GRAHAM & CO., General Agents, 113 Chambers St., New York.

He had in his possession 55 skeleton keys which the police claim would open any door.
—Chicago Tribune.

You are selling that kind of a lock every day and

your customers think you are selling the best the market affords.

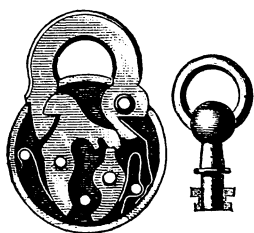
ARE YOU SELLING the best the market affords?

The Craig Locks are guaranteed Sneak Thief Proof.

Send for Catalogue.

KEYLESS LOCK CO., 1. A. 197 So. Canal St., Chicago, Ill.

PATENT PERFECTION PADLOCK.



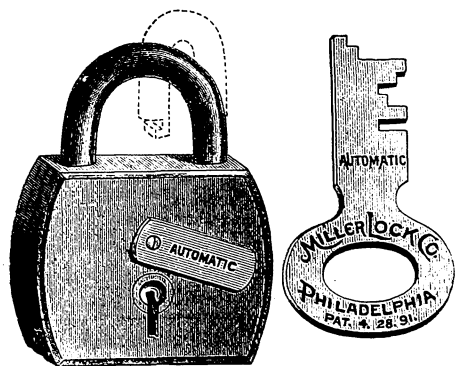
Eight Tumblers, Key Turning Both Ways.

Sizes, $\frac{1}{4}$ inch to $\frac{3}{4}$ inches, of cast bronze. Defies competition for quality and price. No steel or iron used, cannot rust, and cannot be picked. Also $\frac{1}{2}$ and $\frac{3}{8}$ inch Padlocks, opened with a common pin, in brass and nickel, for cats and small dogs. The best Railroad Switch and Car Lock in the world.

Adopted by the United States Treasury for bonded warehouses.

AMES SWORD CO., Chicopee, Mass.

Send for Price-Lists and Circulars.



No Padlock ever struck the American Market so favorably as the

"AUTOMATIC."

They are novel and durable, and have tenfold more changes of key than are usual in locks at the price.

Per Doz

No. 406—Steel, Dark Finish, 2-Keyed, \$7.20

" 407—Brass, Bright " 2 " 8.50

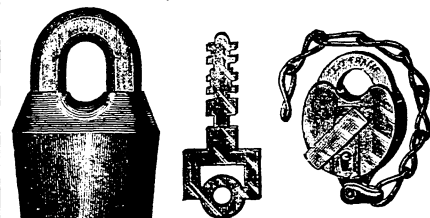
" 400— " Plated, 1 " 6.60

For sale by the jobbing trade.

MILLER LOCK CO., Lock Manufacturers,

Frankford, Philadelphia, Pa.

ESTABLISHED 1879.
KEYSTONE LOCK WORKS,
E. T. FRAIM, Lancaster, Pa., U. S. A.



Originators, designers, patentees and manufacturers of all the leading popular styles of **PADLOCKS**, Key-Locking Scandinavian with our patent Inter-Locking Tumblers; the only reliable lock of this style ever made. **SELF-LOCKING** Scandinavian of the highest type of perfection. Dust Proof Railroad, Freight Car and Switch Padlocks. Brass, Bronze, Steel and Malleable Iron Padlocks for all purposes and in all finishes. 131 different kinds. Write for our new 100-page catalogue.

SURPLESS, DUNN & ALDER, General Agents,
97 Chambers St., NEW YORK.

SIMPLEST IN CONSTRUCTION.
EASIEST FITTED.



**Cheapest and Best
Balance Made.**

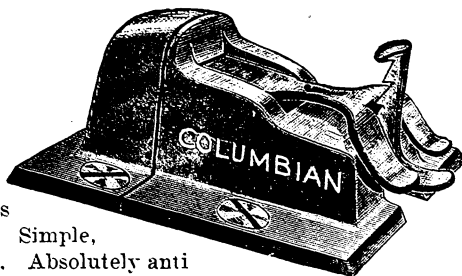
WRITE FOR CATALOGUE.

The Vanderbilt Sash Balance Co.,
CANANDAIGUA, N. Y.

General Agents, Harmon & Dixon, 113 Chambers St.
New York.

Columbian Sash Lock.

Locks three ways with one motion. Simple, strong and durable. Absolutely anti rattle and burglar proof. Sample by mail, 35c.



COLUMBIAN SASH & DOOR LOCK CO.,
WAUSEON, OHIO.

CLOTHES WRINGERS. COLBY WRINGER CO.,

MONTPELIER, VT.

HAVE YOU Our Price-List?

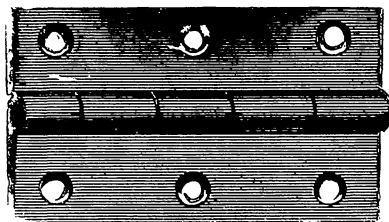


C. H. WOLFF,
177 William St., N. Y.

**STEEL ALPHABETS
STEEL NAME STAMPS
BURNING BRANDS**

STENCIL DIES.

Send for Catalogue.



Cast Brass Butt Hinges

IN STOCK AND FOR SALE BY

W. & J. TIEBOUT,

Nos. 16 & 18 Chambers Street, New York,

MANUFACTURERS OF

**BRASS, GALVANIZED & SHIP CHANDLERY
HARDWARE.**

A Well Balanced Sash

IS LIKE

A Well Balanced Business Man,

gives satisfaction to those who are brought in contact with them. Don't be inveigled into

buying anything called Sash Balances that have no record. Made from light cast iron. Ask your Hardware dealer for Pullman Steel Frame Sash Balance. Warranted 15 years. Only Steel Frame Sash Balance in the world.

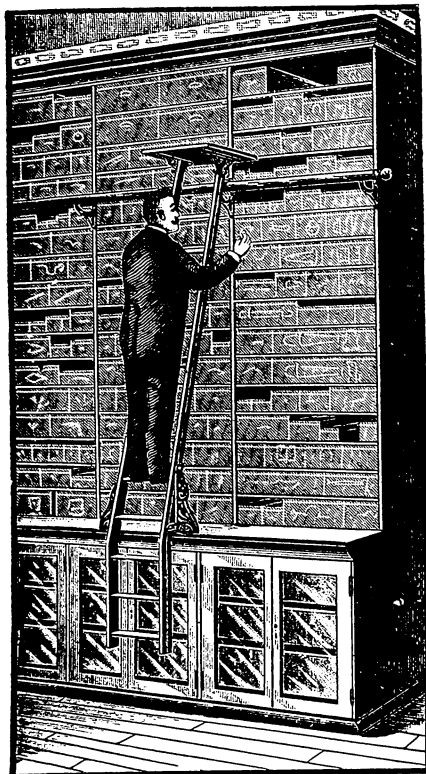
SIMPLE, CHEAP

AND DURABLE.

PULLMAN SASH BALANCE CO., Rochester, N. Y.

New York Office, 142 Chambers St.

Chicago Office, 235 Lake St.

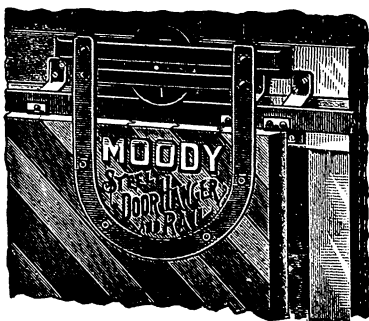


THE BICYCLE STEP LADDER.

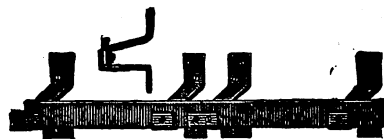
The Newest, Neatest, Simplest, Easiest Operated and Safest Store Ladder made. Ladders are not Suspended, but Supported from below on wheels. Move easier with operator on than others when empty. Highly finished, and very handsome. Made in different grades and prices to suit. Send for illustrated catalogue and prices. See this space next week for other styles.

The Bicycle Step Ladder Co., 50 State Street, Chicago, Ills.

VICTOR MFG. CO., Newburyport, Mass. STEEL RAIL.

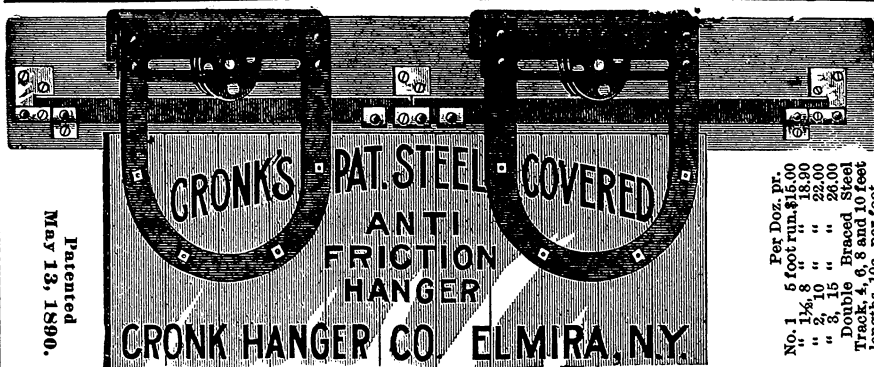


Showing one-half set of hangers attached to door.



The Only Bracing Bracket Made.

HANGERS.	PRICE-LIST.	Per Doz. prs.
No. 5, to run 6 feet, $3\frac{1}{4}$ in. wheel,	-	\$10.00
No. 6, to run 10 feet, $4\frac{1}{2}$ in. wheel,	-	15.00
No. 7, to run 15 feet, $5\frac{1}{2}$ in. wheel,	-	22.00
RAIL, per foot.....		$8\frac{1}{2}$ cent



We are the original makers of steel covered hangers and all others are imitations. Beware of infringements, as we shall protect our rights.

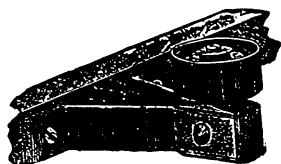
In our Steel Covered Hangers we have all the desirable features of the Best Hangers in the market, and with that we combine the cover for wheels SO NO ICE OR SNOW can reach the wheels, and making this cover as we do, we stiffen it so it is the strongest Hanger in the market, and we believe it is just perfect. Would be glad to have you try a small order and satisfy yourself.

Double-Braced Steel Rail.

PATENTED JUNE 12, 1888.

This rail being double-braced and double-riveted is the strongest rail in the market. Being braced both ways it will not sag. The joint is made so it is perfectly solid. It comes complete and ready for use, requiring only screws and screw driver for any man or boy to put it up in short order. It can be used for any grooved wheel Hanger, and a heavy door will not make it spring or tremble. Guaranteed to hold a door weighing 2,000 pounds, and used in connection with our Anti-Friction Hanger will work perfectly on large or small doors.

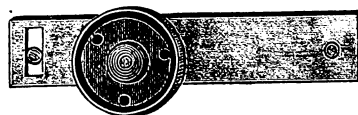
Cronk's Adjustable Stay Roller.



Made of wrought steel strap; cast block with slot adjusted by loosening bolt.

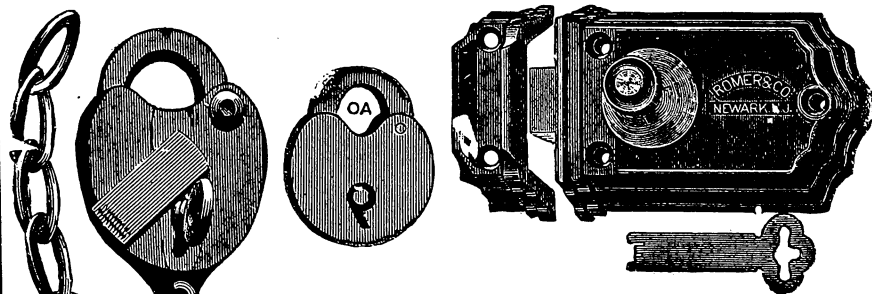
Pacific Coast Agents, CHAS. L. PIERCE & CO., San Francisco, Cal.

Cronk's Inside Adjustable Stay.



Is cheap, simple and durable, and much better than a cleat nailed on the floor for this avoids all friction and leaves no place for dirt to accumulate. \$2.00 per doz. No inside door can be properly hung without this stay.

ROMER & COMPANY, Manufacturers of PATENT JAIL LOCKS, BRASS and IRON PADLOCKS,

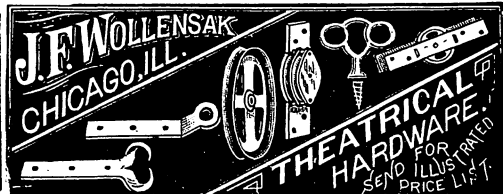
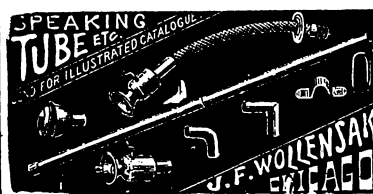


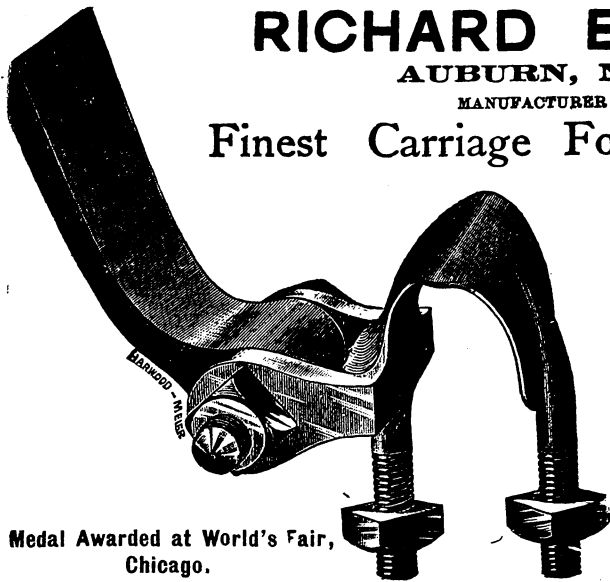
Adjustable Door Knobs and Trimmings,
Front Door Handles.

Patent Horizontal Rim Cylinder Reversible Night Latches.

Illustrated Lists sent to the Trade on application.

275.277 and 279 Passaic St., near Erie and D. L. & W. R. R. Depots, Newark, N. J





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MANUFACTURER OF

Finest Carriage Forgings, Couplings, Clips, King Bolts, Fifth Wheels, &c. Manufacture a full line Special Drop Forgings.

Medal Awarded at World's Fair, Chicago.

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TACKLE BLOCKS

—MADE BY—

The Cleveland Block Co.

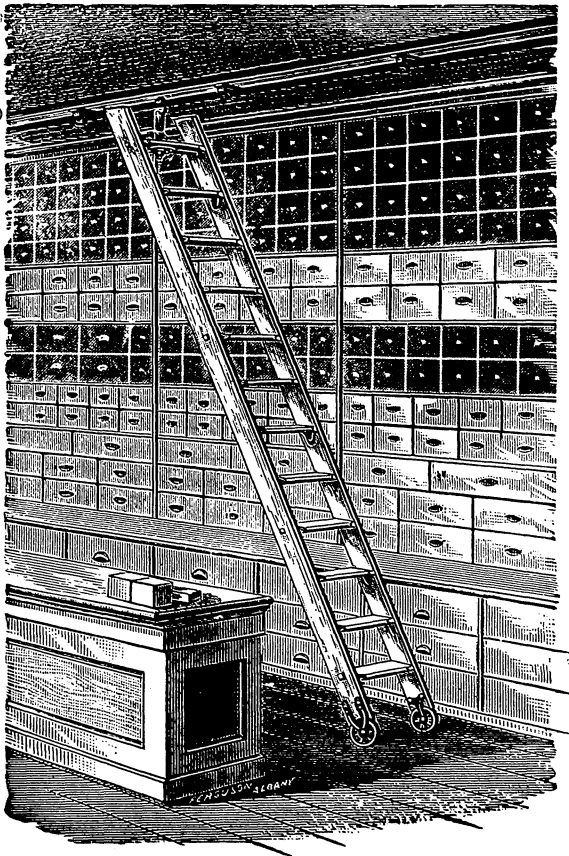
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ARE BETTER IN EVERY WAY.

No waste material. Every ounce of weight in the line of strength. No clumsy outside straps or bolts. As light as wooden blocks and vastly more durable. They wear, but never break. Sheaves interchangeable.

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The latest and best. Perfectly noiseless. Neat in appearance.

Manufactured by

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FROST'S ANTI-RATTLE

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Cut One-half Size.

Sample pair sent to any hardware or saddlery firm by addressing

The Frost Thill Spring Co.,
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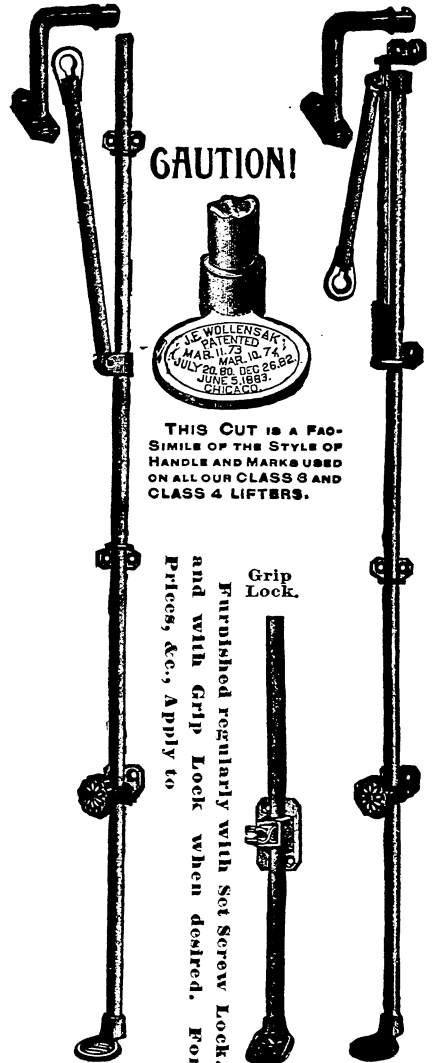
Transom...Lifters

OLD RELIABLE

J. F. WOLLENSAK'S PATENT.

CLASS 3.

CLASS 4.



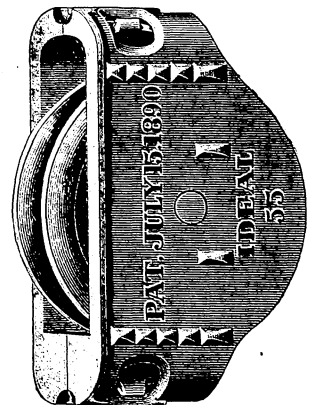
CAUTION!

THIS CUT IS A FAO-SIMILE OF THE STYLE OF HANDLE AND MARKS USED ON ALL OUR CLASS 3 AND CLASS 4 LIFTERS.

Grip Lock.
Furnished regularly with Set Screw Lock, and with Grip Lock when desired. For Prices, &c., Apply to

J. F. WOLLENSAK. - CHICAGO, ILL.

Ideal Sash Pulley, No 55.



Adapted for auger socket or machine made mortise. Applied without chisel or screws, quickly and a perfect fit in every case. The only all round Sash Pulley made. Sample free. Price on application.

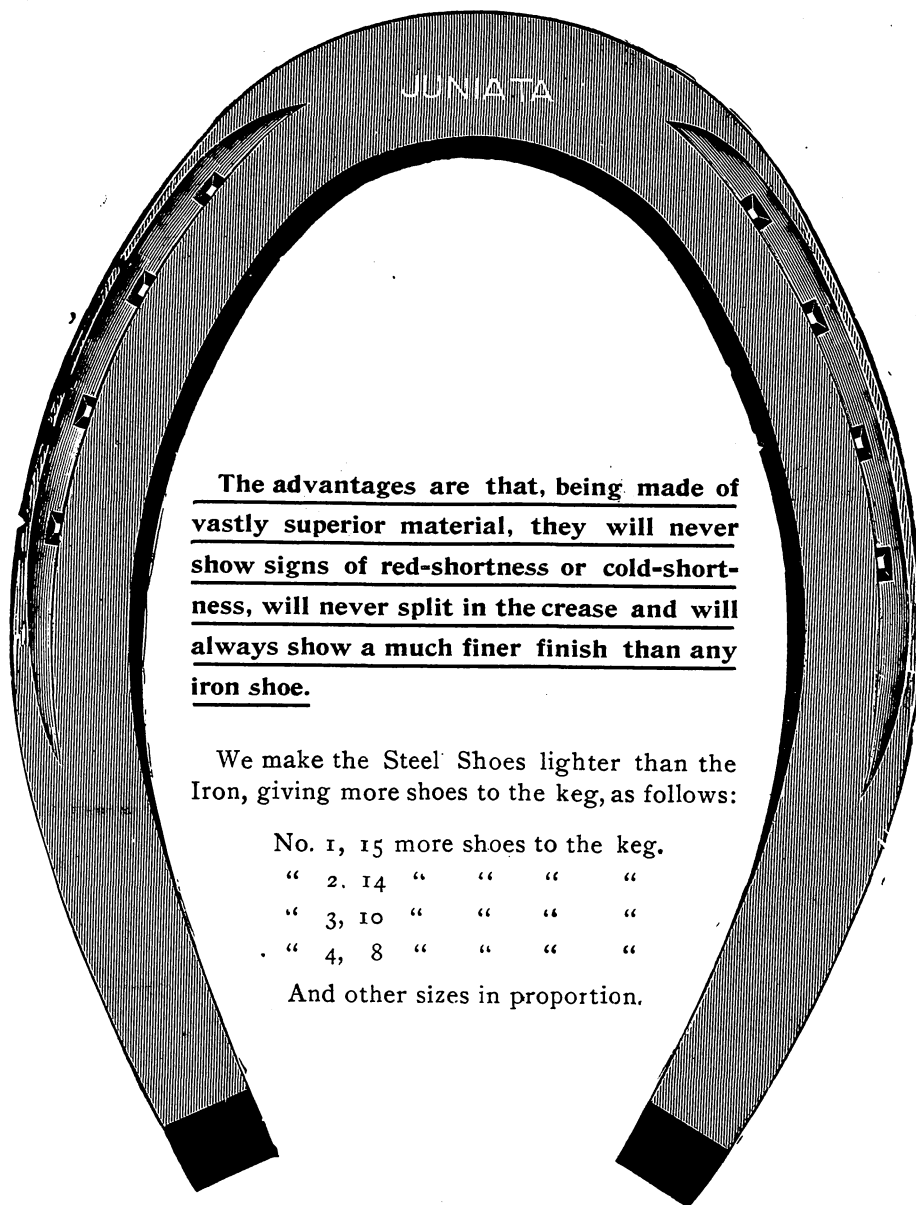
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STEEL HORSE SHOES.

SHOENBERGER & CO., PITTSBURGH, PA.,

After numerous and costly experiments have succeeded in manufacturing a special quality of soft homogeneous steel, specially adapted to the manufacture of Horse and Mule Shoes, and are now making from this steel Extra Swaged, and Government Pattern Horse and Mule Shoes. They give the best of satisfaction everywhere and we furnish them to the trade at the same prices as the regular iron shoe sold by ourselves and our competitors. We are at present making our Roadster Pattern Horse Shoes out of Iron, but we will make them of Steel also within a short time.



The advantages are that, being made of vastly superior material, they will never show signs of red-shortness or cold-shortness, will never split in the crease and will always show a much finer finish than any iron shoe.

We make the Steel Shoes lighter than the Iron, giving more shoes to the keg, as follows:

No. 1, 15 more shoes to the keg.

" 2, 14 " " " "

" 3, 10 " " " "

" 4, 8 " " " "

And other sizes in proportion.

No. 2 EXTRA SWAGED HIND.

We also beg to say that we have introduced improved machinery into our new factory and have doubled our capacity, and are now prepared to furnish the best shoe, either iron or steel, ever offered to the trade.

We would also call your attention to our Improved Steel Toe Calk, equal to any in the market. To secure the best wearing qualities use sand or borax in welding on a calk and cool off at a dark red, or still better, cool off without plunging in water. We make sizes numbers 1, 2, 3, 4, 5 and 6, packed in 25 pound boxes.

Write to us for information and prices, or apply to jobbers and dealers, who sell them everywhere.

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JUNIATA IRON AND STEEL WORKS, - - - PITTSBURGH, PA.

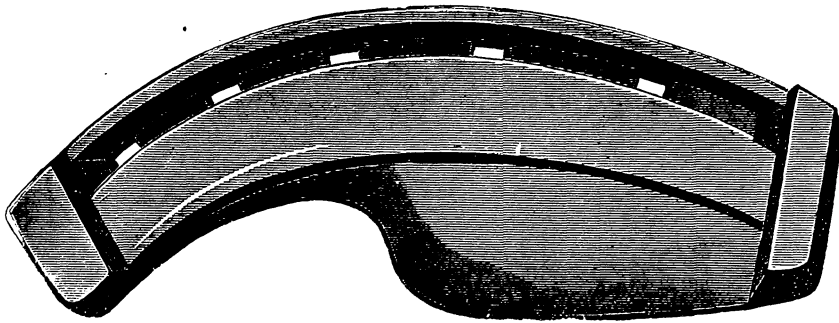
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CARRIAGE HARDWARE AND

SPECIAL DROP FORGINGS.

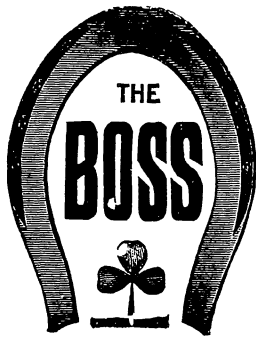
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OX
SHOES.



Made under Deebie's Patent, Aug. 9, 1887.

Our 1891 pattern is a modification of the style we have made for the past four years, giving additional strength to the web.

IT IS JUST RIGHT.



HORSE AND MULE SHOES.

Superior Quality, Shape and Finish.

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Horse and Mule Shoes of the Perkins Pattern.

SPECIALTIES:—X L Steel Shoes, Toe Weight Shoes and Goodenough Shoes.

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THE NEW DIAMOND STATE HORSE AND MULE SHOES.

JUST TRY THEM and YOU will say they excel all others.

MANUFACTURED BY

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Other "high grade" specialties in Rivets, Spikes, Splice Bars, Track and Machine Bolts, Blanks, Stay Bolt Iron, Horse Shoe Iron, Bar Iron, &c.

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{ Correspondence invited }

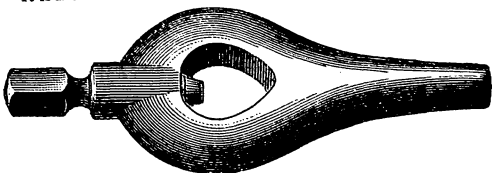
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LE COUNT'S STRAIGHT TAIL DOG,

WITH STEEL SCREWS.

U. S. Standard, and the points hardened. To be driven from a stud in the face plate.

It is from the same pattern as the Heavy Steel Dog, and warranted, like that, not to break with any work.



No.	Inch.	Price.	No.	Inch.	Price.
1.....	3/4	\$0 80	11.....	3 1/2	\$1 45
2.....	1	70	12.....	4	1 80
3.....	1 1/4	70	13.....	4 1/2	1 80
4.....	1 1/2	80	14.....	5	2 10
5.....	1 3/4	80	15.....	5 1/2	2 75
6.....	2	95	16.....	6	3 25
7.....	2 1/4	95	17.....	6 1/2	4 00
8.....	2 1/2	1 10	18.....	7	5 00
9.....	2 3/4	1 20	19.....	7 1/2	5 00
10.....	3	1 35	20.....	8	7 00

One set to 2 inch, \$7.80. Full set, \$14.10

This pattern will stand much more than a bent tail, and some prefer them on account of their direct action on the work.

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These goods are for sale by CHAS. CHURCHILL & CO., Ltd., 21 Cross St., London, England.

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HORSE SHOES.

"Burden Best"

Iron

Boiler Rivets.

The Burden Iron Co.

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PHOENIX HORSE SHOES.

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NEW YORK OFFICE, No. 66 Reade St.

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Manufacturers of
HORSE AND MULE SHOES.

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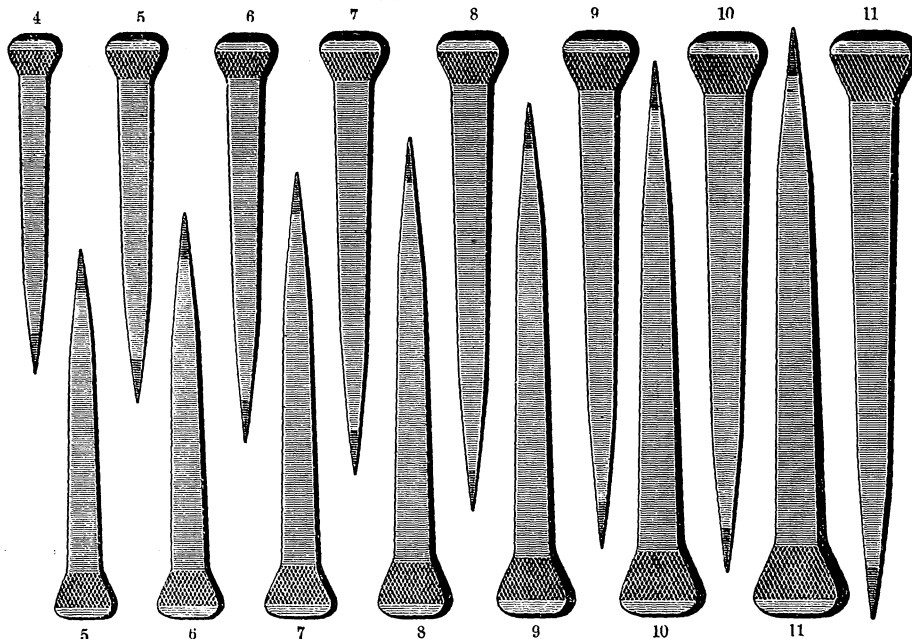
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CAPEWELL HORSE NAILS.

"Tensile strength one-half greater than that of any other nail made."

CITY HEADS.



REGULAR HEADS.

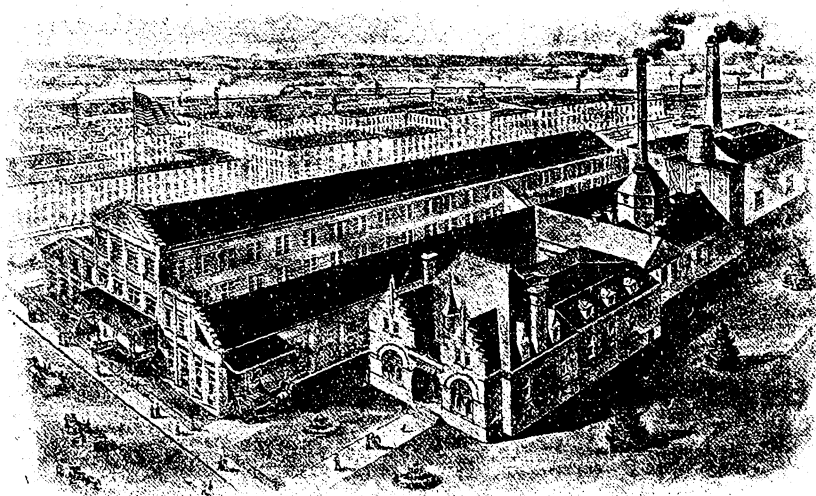
The Capewell Patent Corrugated Horse Nail.

Needs no
Clinching.

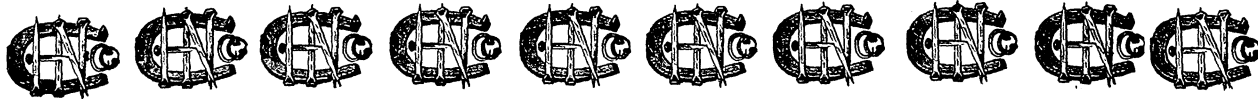


Made in
All Sizes.

"The Coming Nail to be Used."—JOHN KIERNAN,
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The Capewell Horse Nail Co.,
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H. D. SMITH & CO.,

Plantsville, Conn.,

MANUFACTURERS OF THE BEST QUALITY

CARRIAGE MAKERS' HARDWARE,

MANUFACTURE THE LARGEST VARIETY OF

FORGED CARRIAGE IRONS

Of Best Material and Workmanship.

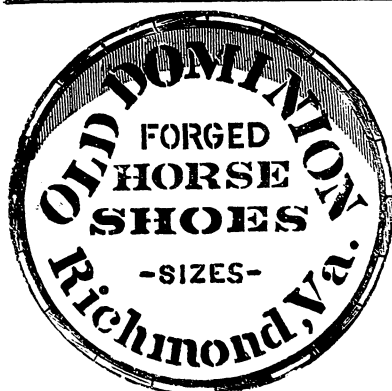
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Manufactured by the **NATIONAL HORSE NAIL CO.,**
VERGENNES, VERMONT.

All Sizes. All Patterns. All Warranted. Sold Everywhere.

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Elegant Iron.

Beautiful Shape.

HORSE SHOES,
Light, Medium and Heavy.

MULE SHOES,
Light, Medium and Heavy.

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All Wrought Steel Center Neck Yoke.



The Strongest, Lightest, Cheapest Yoke on the Market.

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(Blunt and Sharp)
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is a fine quality of Axle Grease put up in square tin boxes containing one pound; beautifully decorated in assorted colors; designed especially for the Hardware Trade. Showy and attractive shelf goods.

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Horse and Mule Shoes,
BAR IRON.

CRESCENT HORSE SHOE AND IRON CO.

Max Meadows, Va.

Highest Award

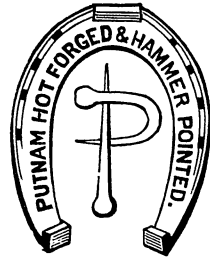
FOR

Supreme Excellence

TO

The PUTNAM Hot-Forged and

Hammer-Pointed Horse NAILS,



At the *World's Columbian Exposition* at Chicago. A medal and diploma worded :
*"Supreme excellence in material, method in manufacture, and quality of finished product; elasticity and smoothness combined with holding power in clinch.
 It allows the use of very small nails."*

There is nothing beyond "supreme excellence," nor is there anything comprised in a horse nail, except the "material from which it is made," "the method of manufacture," and "quality of finished product."

Putnam nails, by their "elasticity," give slightly to the expansion and contraction of the hoof while the horse is in motion; by their "smoothness," do not enlarge the nail holes in the hoof, while their "supreme excellence," in "holding power in the clinch," enables them to hold the shoe in the hardest service until worn out.

By the "use of small nails," large holes are avoided and money saved to the smith.

Thus it will be seen that the officials of the *World's Columbian Exposition* recognize what qualities go to make up a good horse nail and that only the "Putnam" contains them all.

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GEO. W. HARTZELL.
 WHOLESALE
 MANUFACTURER.

GREENVILLE, O.
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ROUGH ASH OR OAK WAGON POLES.

Finished Wagon Material!
 (Not rough) is what the trade of to-day demands.

Finished White Oak Poles,
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Finished Doubletrees,
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FOR DOORS AND WINDOWS, ARE WELL
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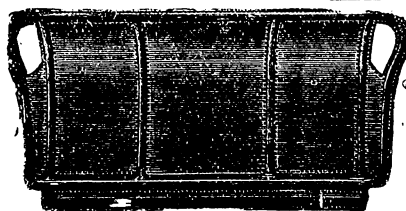
LIMITED, Manufacturers of

FINE QUALITY

DASHES

AND

FENDERS,



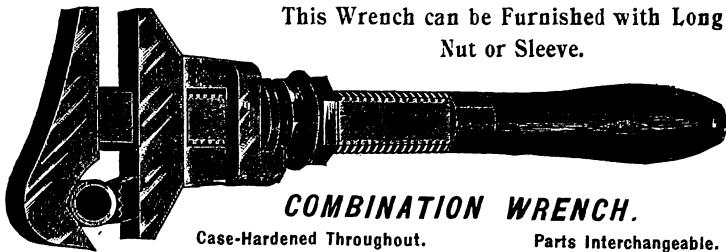
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SURREY DASH.

BUFFALO. - N. Y.

BUFFALO SCALE CO., Buffalo, N. Y.

SCALES OF ALL KINDS.



This Wrench can be Furnished with Long Nut or Sleeve.

COMBINATION WRENCH.

Case-Hardened Throughout. Parts Interchangeable.

This wrench not only combines the superior qualities of a Gas Pipe Wrench but also all the requisite combinations of a regular Nut Wrench, thus making a combination which has no equal. For Circulars and Price-List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass., U. S. A.



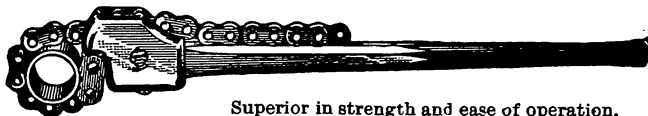
TRIMO PIPE WRENCH,

Forged Steel

All parts interchangeable.

Grips firmly without loss of motion. Releases readily. Never locks. Causes no trouble in close quarters. Does not crush the pipe.

TRIMO CHAIN PIPE WRENCH.



Superior in strength and ease of operation. COMPLETE circular grip. Never slips nor crushes.

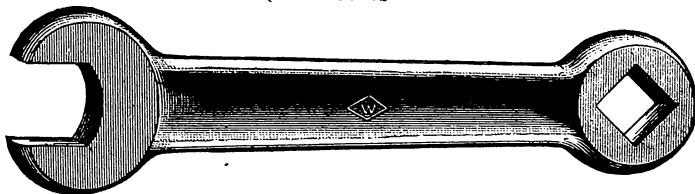
Can be used with one hand and in closer quarters than any other Basin Wrench. Parts Interchangeable.

TRIMO BASIN WRENCH.

TRIMONT MFG. CO., ROXBURY MASS.

STEEL DROP-FORGED DOUBLE HEAD TOOL POST WRENCHES.

(FIVE SIZES.)



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MANUFACTURERS OF

Brock's Patent Chain Pipe Wrench and General Drop-Forgings.



THE SPENCER NAIL PULLER

Has no springs to get out of order. Pulls nails straight.

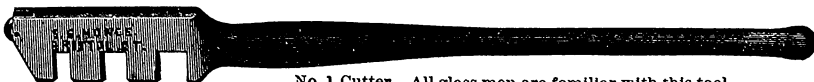
Its jaws open and close positively. Pulls large and small nails with equal facility.

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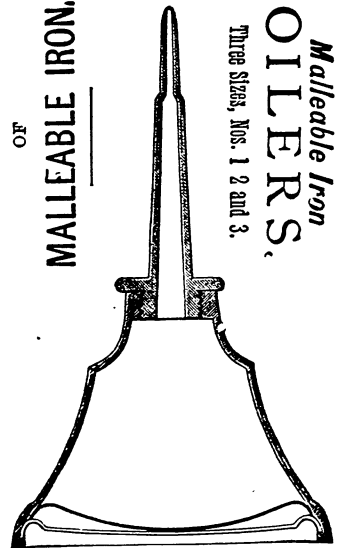
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Three Sizes, Nos. 1, 2 and 3.

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New Pattern Heavy Screw Clamps.
Strongest in the market.

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MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties
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A Full Line of Carriage Hardware
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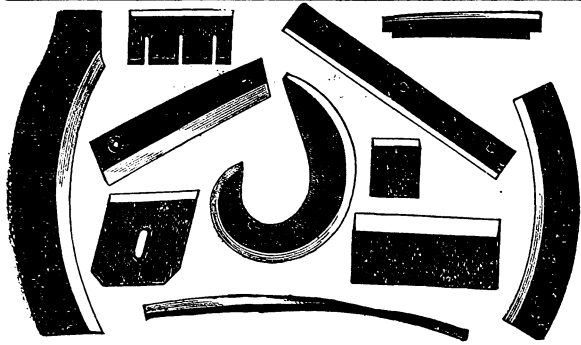
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Shear Blades and Strips, Moulding Cutter Plate, Die Stock for Leather, Cloth and Paper Cutting Dies. Lawn Mower and Hay Cutter Knives of every description.

End view of Plated Stock for Dies, Lawn Mower Knives, Blades

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Awarded Prize Medal at Paris Exposition and Jamaica Exposition



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Standard Bright
Finish.



HERCULES.
Complete Bright and
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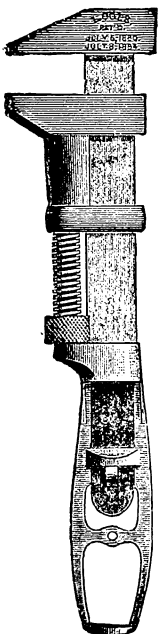
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Genuine Improved
**KNIFE HANDLE
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**Screw
Wrenches**

MANUFACTURED BY
COES WRENCH CO.,
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Established in
1839.

Registered
March 31, 1874.

Patented July
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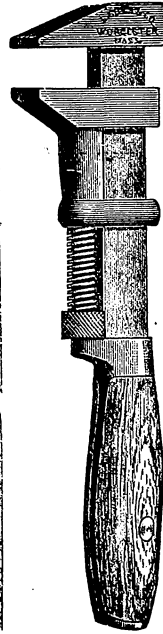
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8, 1884.

Sectional View Illustrates our New Knife Handle, showing Malleable Iron Frame and Shank of Bar keyed into position.

✓ Straight Bar, Extra Long Nut for Screw in Jaw. ✓

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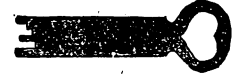
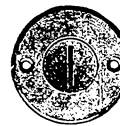
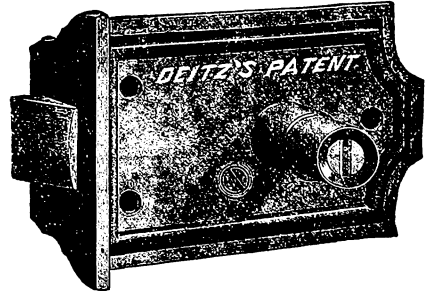
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SAMPLE 15¢.

SEAMLESS
BRASS
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Lid Solid
No SOLDERING

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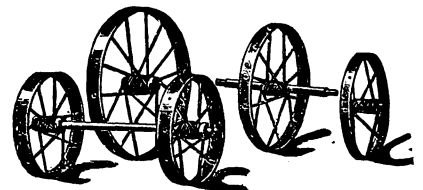
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Factory, BROOKLYN, E. D., N. Y.

WHEELS. WHEELS. WHEELS.



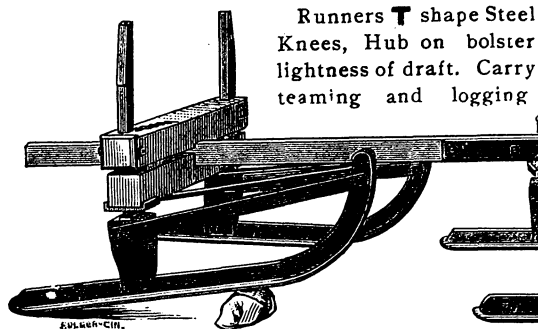
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THE Arnold Metal Wheel Co.

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HASLUP'S OSCILLATING STEEL BOB SLED AND RUNNERS.



Runners T shape Steel Knees, Hub on bolster lightness of draft. Carry teaming and logging

Rail, Bearing and Upright Rib one piece, complete with Steel malleable iron. Lightness, Strength and Durability combined with from 8 to 10 tons. Won't break or snap. The boss for farm use Cheap! Send for Circular and Prices. Remember also that we make

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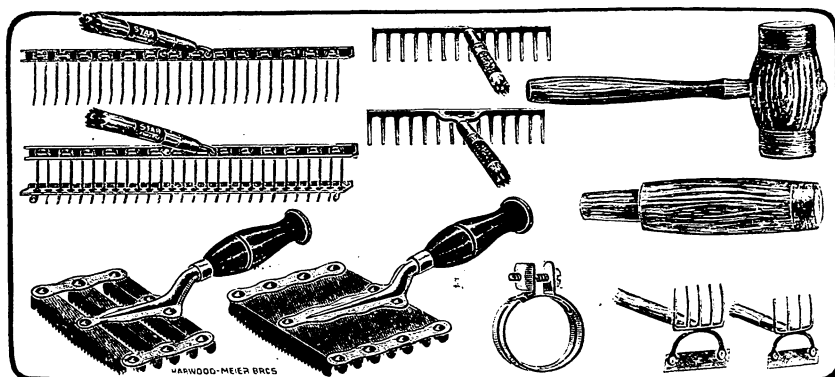
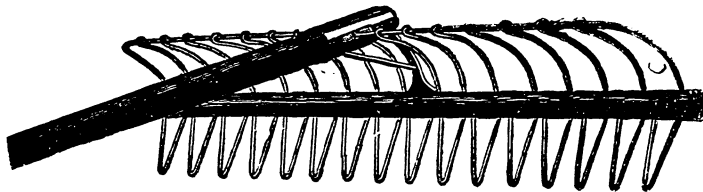
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LAWN RAKES. The "GEM" AND "DAVIS."

Both good and each the best. If you have not stocked up, better do so at once. Our prices are low.

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BOLT CUTTERS

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CYCLONE CORN SHELLER.

Will Shell a Bushel of Corn

in 4 Minutes.

BEST SHELLER in the world.

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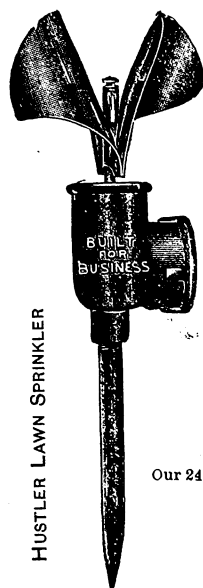
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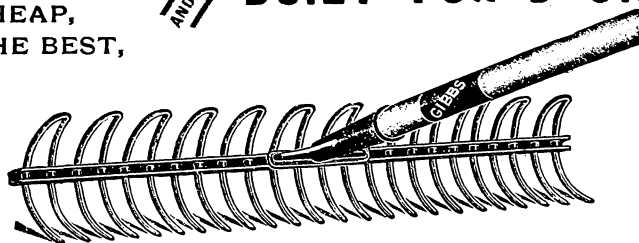


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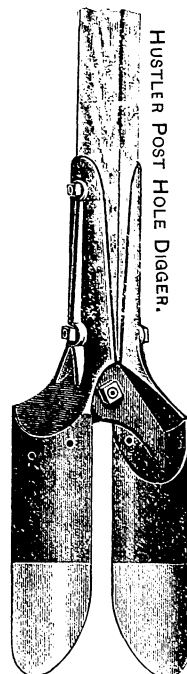


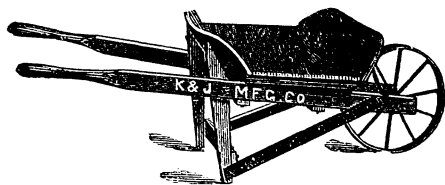
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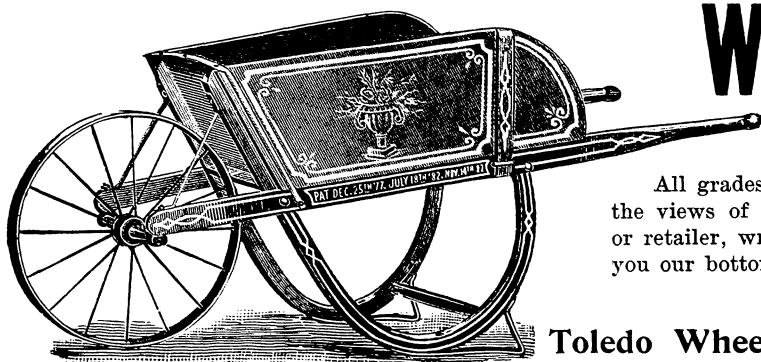


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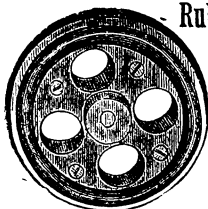
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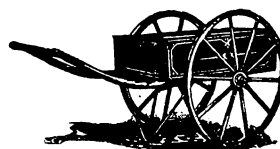
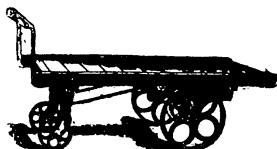
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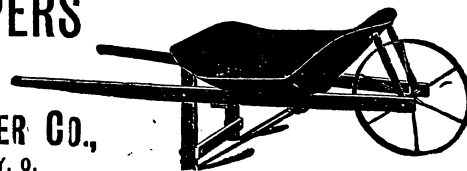
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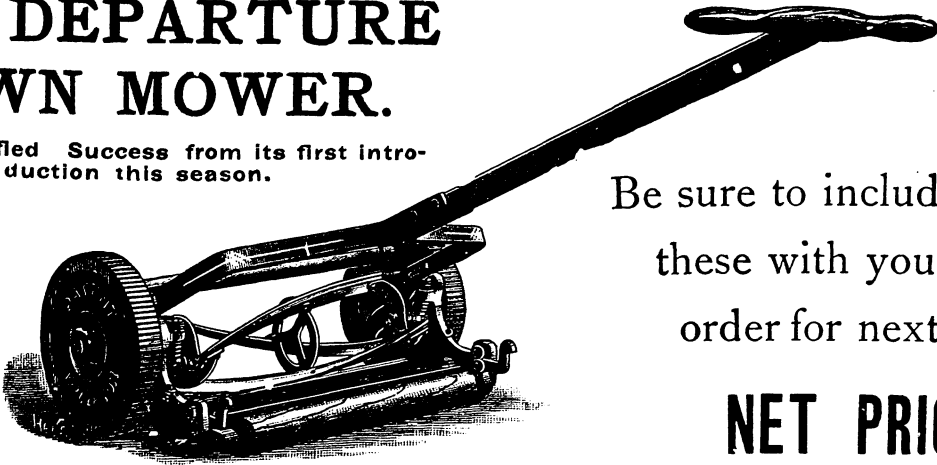


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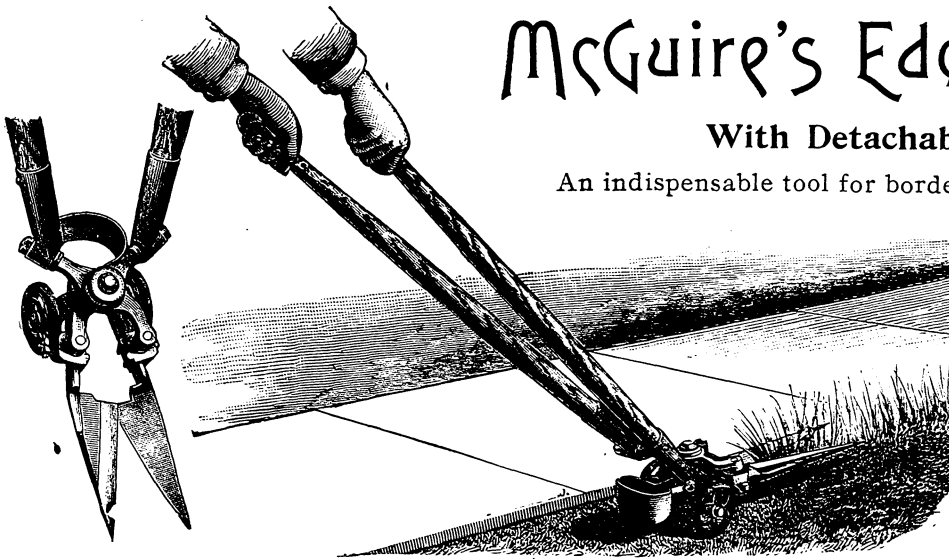


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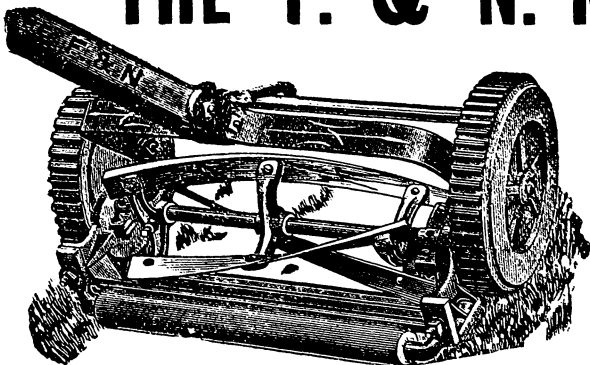
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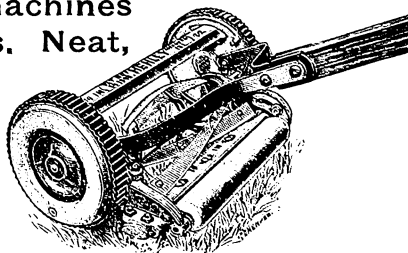


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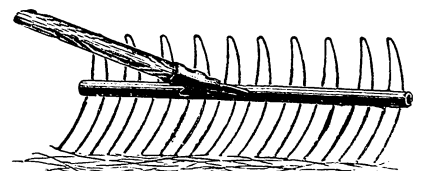
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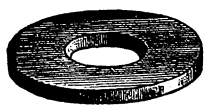
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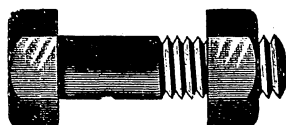
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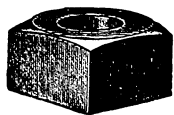
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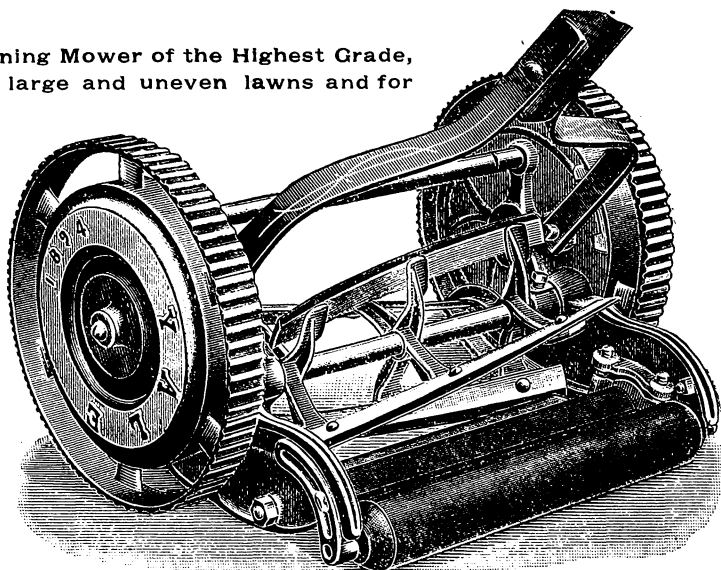
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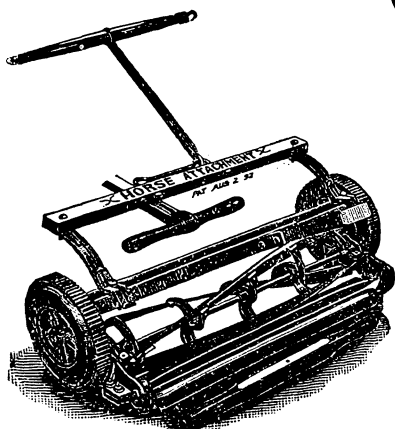
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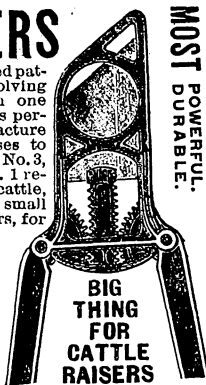
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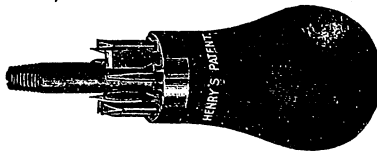
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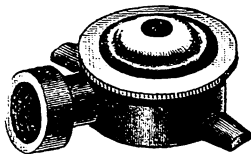
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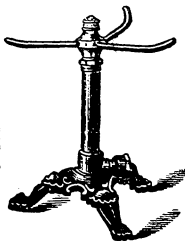


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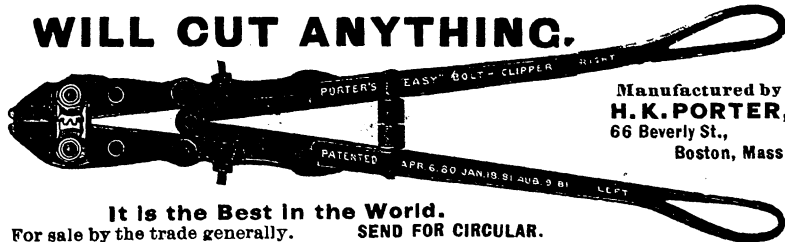
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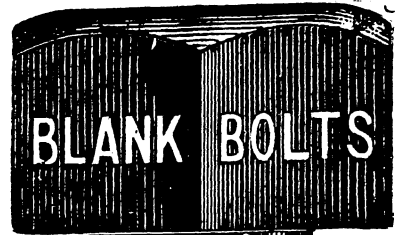
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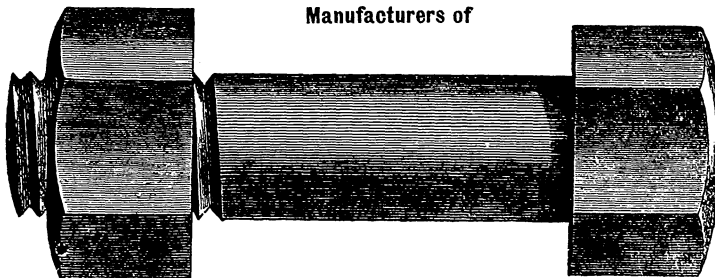
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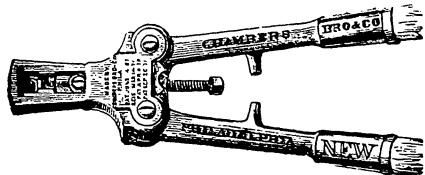
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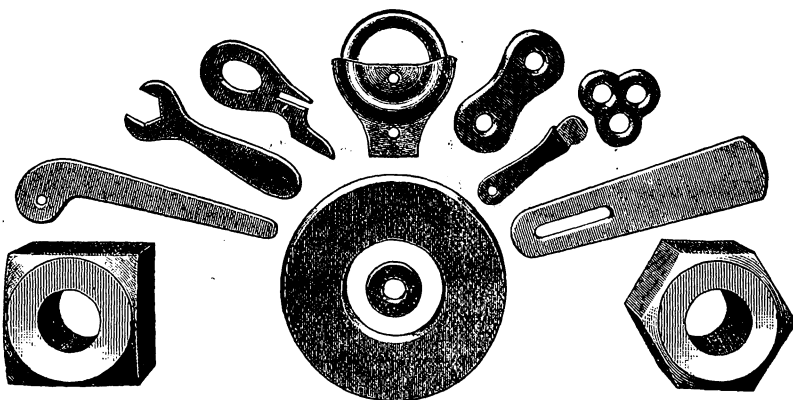
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Pollock, W. B. & Co., Youngstown, O.
Southwall Fdy. & Mch. Co., Phila., Pa.
Wetherill, Robt. & Co., Chester, Pa.
- Bolt Cutters.**
Chambers Bros. Co., Philadelphia.
Howard Iron Works, Buffalo, N. Y.
Porter, H. K., Boston, Mass.
Reece, Edw. F., Greenfield, Mass.
Wells Bros. Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Books.**
Marine Review, Cleveland, Ohio.
Williams, David, 96-102 Reade, N. Y.
Willcott & West, Syracuse, N. Y.
- Boring Machines.**
Buckeye Mfg. Co., Union City, Ind.
- Boxes, Hdw. Shelf, &c.**
Green, A. H., 22 Park Place, N. Y.
Jones, Jesse & Co., Philadelphia, Pa.
- Box Strap.**
Cary Mfg. Co., 5-9 Elm St., N. Y.
- Box Straps and Corners.**
Buffalo Specialty Mfg. Co., Buffalo, N. Y.
- Brackets.**
Atlas Mfg. Co., New Haven, Conn.
- Brass, Manufacturers of.**
Ansonia Brass & Copper Co., N. Y.
Devol, J. John & Sons, 100 John, N. Y.
Plum & Atwood Mfg. Co., N. Y.
Randolph & Clowes, Waterbury, Conn.
Scovill Mfg. Co., Waterbury, Conn.
Waterbury Brass Co., 296 B'way, N. Y.
- Brass Butt Hinges.**
Tiebout, W. & J., 16 & 18 Chambers.
- Brass Founders.**
Best, Fox & Co., Pittsburgh, Pa.
Bridgeport Deoxidized Bronze & Metal Co., Bridgeport, Conn.
Cramp, Wm. & Sons, S & E. B. Co., Philadelphia, Pa.
Emory, P. P. Mfg. Co., Springfield, Mass.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Fralin, E. T., Lancaster, Pa.
Haight & Clark, Albany, N. Y.
Keys, W. W. & R. M. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Phila., Pa.
Reeves, Paul S., Philadelphia.
- Brass Goods.**
Brass Goods Mfg. Co., 88 Chambers.
- Bread and Cake Knives.**
Christy Knife Co., Fremont, O.
Clausen Shear Co., Fremont, O.
- Bridge Builders.**
Berlin Iron Bridge Co., East Berlin, Ct.
Boston Bridge Works, Boston, Mass.
Wrought Iron Bridge Co., Canton, O.
- Bronze (Tobin).**
Ansonia Brass & Copper Co., 19-26 Cliff Street, N. Y.
- Brooms and Brushes.**
Cincinnati Mfg. Co., Cincinnati, O.
Lay, Jos. & Co., Ridgeville, Ind.
- Builders' Hardware.**
Corbin, P. & F., New Britain, Conn.
Deltz, A. E., 97 Chambers St., N. Y.
Reading Hdw. Co., Reading, Pa.
Russell & Erwin Mfg. Co., New York.
Yale & Towne Mfg. Co., Stamford, Ct.
- Butchers' Steels.**
Chattillon, John & Sons, 85-89 Cliff St., N. Y.
Hoffman, C. & A., Philadelphia, Pa.
- Butcher and Shoe Knives, Manufacturers of.**
Chattillon, John & Sons, 85-89 Cliff St., N. Y.
Goodell Co., Antrim, N. H.
Wilson, John, Sheffield, England.
- Butts and Hinges.**
McKinney Mfg. Co., Allegheny, Pa.
Sabin Machine Co., Montpelier, Vt.
- Stanley Works, New Britain, Conn.**
Tiebout, W. & J., 16 Chambers, N. Y.
- Cutlery and Dividers.**
J. Stevens Arms and Tool Co., Chicopee Falls, Mass.
Starrett, L. S., Athol, Mass.
- Car Weenars.**
Carroll Muzzle Co., Carroll, Ia.
- Car Axles.**
Roberts, A. & P. & Co., Phila.
- Carboy Stands.**
Hillebrand & Wolf, Philadelphia, Pa.
- Car Wheels.**
Whitney, A. & Sons, Phila.
- Carriage Hardware, Makers of.**
Cover's Saddlery Works, Farmer, N. Y.
Eccles, Richard, Auburn, N. Y.
Hartzell, Geo. W., Greenville, O.
McKinnon Dash & Hdw. Co., Ltd., Buffalo, N. Y.
Scranton Forging Co., Scranton, Pa.
Smith, H. D. & Co., Plantville, Conn.
Wileox & Howe Co., Birmingham, Conn.
- Cartridge Reloading Tools.**
Ideal Mfg. Co., New Haven, Conn.
- Casters, Wheel, &c.**
Clark, G. P., Windsor Locks, Conn.
- Castings, Iron and Steel.**
Ames Sword Co., Chicopee, Mass.
Arcade Malleable Iron Co., Worcester, Mass.
Beech, The Lloyd Co., Youngstown, O.
Burgess & Loxley, Buffalo, N. Y.
The Burr & Houston Co., Brooklyn, N. Y.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Cheney, S. & Son, Manlius, N. Y.
Chester Steel Casting Co., Phila.
Chrome Steel Works, Brooklyn, Conn.
Dayton Malleable Iron Co., Dayton, O.
Ette & Henger Mfg. Co., St. Louis, Mo.
Eureka Cast Steel Co., Chester, Pa.
Flagg, Stanley G. & Co., Phila.
Garland Foundry Co., Cleveland, O.
Haight & Clark, Albany, N. Y.
Harner & Co., Sonoma, Calif.
Herrick, J. A., 284 Pearl St., N. Y.
Johnson, I. G. & Co., Spuyten Duville.
Mahoning Fdry & Mch. Co., Danville, Pa.
Palmer & De Mooy, Cleveland, O.
Sessions Foundry Co., Bristol, Conn.
Shilling Fdy. Co., Columbus, O.
Spencer, L. S. Sons, Guilford, Conn.
Standard Fdy. & Mfg. Co., Cleveland, O.
Standard Steel Casting Co., Thurlow, Pa.
Taylor & Boggis Fdry. Co., Cleveland, Ohio.
Taylor Iron & Steel Co., High Bridge, N. J.
Totten & Egg, Iron & Steel Fdry Co., Pittsburgh, Pa.
Union Mfg. Co., 103 Chambers St., N. Y.
Wetherill, Robt. & Co., Chester, Pa.
- Chains.**
Bradlee & Co., Philadelphia.
Bridgeport Chain Co., Bridgeport, Conn.
Link-Belt Engineering Co., Phila., Pa.
McKay, Jas. & Co., Pittsburgh, Pa.
- Chimneys.**
Phila. Engineering Works, Phila., Pa.
- Chisels, Manufacturers of.**
Suck Bros. Millbury, Mass.
White, L. & J. J. Co., Buffalo, N. Y.
- Chucks.**
Cushman Chuck Co., Hartford, Conn.
Smith & Edge Mfg. Co., Bridgeport, Conn.
Union Mfg. Co., 103 Chambers, N. Y.
Wilson, D. E. Mach. Co., New London, Conn.
- Clamps.**
Hammer & Co., Branford, Conn.
Le Count, C. W., So. Norwalk, Conn.
- Clippers.**
Lee, Jesse & Sons, Philadelphia, Pa.
- Clipping Machines.**
Hotchkiss, E. S., Bridgeport, Conn.
McCoey, Jos. F. & Co., 28 Warren St.
- Coal.**
Barns, C. K. & Co., Philadelphia, Pa.
Wister, Francis, Philadelphia, Pa.
- Coffee and Spice Mills.**
Sun Mfg. Co., Greenfield, O.
Waddell Wooden Ware Works, Greenfield, O.
- Coke.**
Barns, C. K. & Co., Philadelphia, Pa.
Houston, C. B. & Co., Philadelphia, Pa.
Rahney, W., Cleveland, O.
Sibbel, Geo. H. & Co., Chicago, Ill.
Wister, Francis, Philadelphia, Pa.
- Collections.**
Hardware Board of Trade (Limited) 4 and 6 Warren, N. Y.
- Condensers.**
Worthington, Henry R., 86 & 88 Liberty Street, N. Y.
- Conveying Machinery.**
Brown Hoisting & Conveying Machine Co., Cleveland, Ohio.
Jeffrey Mfg. Co., Columbus, O.
Link Belt Engineering Co., Phila., Pa.
- Copper.**
Ames Sword Co., Chicopee, Mass.
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Hendricks Bros., 49 Cliff, N. Y.
New Haven Forge Co., 204 Pearl, N. Y.
Randolph & Clowes, Waterbury, Conn.
Wister, Francis, Philadelphia, Pa.
- Coppersmith.**
Emory, P. P. Mfg. Co., Springfield, Mass.
- Cordage.**
Samson Cordage Works, Boston, Mass.
- Cork Screws.**
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Cornice Brakes.**
Beetsch & Co., Cambridge City, Ind.
Robinson J. M. & Co., Cincinnati, O.
- Corn Poppers.**
Olsen, A. B., Kansas City, Mo.
- Corn Shellers.**
Garry Iron Mfg. Co., Cleveland, O.
- Corrugated Furnaces.**
Continental Iron Wks., Brooklyn, N. Y.
- Corrugated Iron.**
Cambridge Roofing Co., Cambridge, O.
Cincinnati Corrugating Co., Piqua, O.
Moseley Iron Bridge & Roof Co., 6 Day N. Y.
- Counting Machines.**
Durant, W. N., Milwaukee, Wis.
Osborn, G. Edw. & Co., New Haven, Ct.
- Coupling.**
Almond, T. R., Brooklyn, N. Y.
- Coverings, Boiler and Pipe.**
Johns, H. W. Mfg. Co., 87 Maiden Lane.
- Crabers.**
Detroit Foundry Equipment Co., Detroit, Mich.
Halsey, W. S. & Co., Birdsboro, Pa.
Harrington, E. Son & Co., Phila., Pa.
Marie & Beckley, Philadelphia, Pa.
Ridgway, Craig & Sons, Coatesville, Pa.
Sellers, Wm. & Co., Inc., Phila., Pa.
Yale & Towne Mfg. Co., Stamford Conn.
- Cupolas, Hot-Blast.**
Byram & Co., Detroit, Mich.
Colliau, Victor, Detroit, Mich.
Detroit Fdry. Equipment Co., Detroit, Mich.
- Cutlery Cases.**
Torrey, J. R. & Co., Worcester, Mass.
- Cutlery, Importers of.**
Field, Alfred & Co., 93 Chambers St., New York.
Gurney, Fred B., 116 Chambers St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Cutlery, Manufacturers of.**
Bingham, W. Co., Cleveland, Ohio.
Christy Knife Co., Fremont, O.
Clausen Shear Co., Fremont, O.
Dane, Stoddard & Kendall, Boston, Mass.
Electric Cutlery Co., 113 Chambers, N. Y.
Goodell Co., Antrim, N. H.
Nichols Bros., Cranfield, Mass.
Northampton Cutlery Co., Northampton, Mass.
Schmactenberg Bros., 98 Chambers Street, N. Y.
Wilson, John, Sheffield, England.
- Dehorner.**
Brown, H. H. Mfg. Co., Decatur, Ill.
- Dies.**
Wilson, J. Fred, Worcester, Mass.
- Die Forgings and Castings.**
Bliss, E. W. Co., Brooklyn, N. Y.
- Dog Collars.**
Chapman Mfg. Co., Meriden, Conn.
Union Hardware Co., Torrington, Ct.
- Door Checks and Springs.**
Corbin, P. & F., New Britain, Conn.
- Door Knobs.**
Bardley, J., 149 & 151 Baxter St., N. Y.
- Door Latches.**
Graham, Jno. H. & Co., 113 Chambers St., N. Y.
- Drain Cleaners.**
Buckeye Mfg. Co., Union City, Ind.
- Drawing Instruments.**
Keuffel & Esser Co., 127 Fulton St., N. Y.
- Drilling Machines.**
Bickford Drill & Tool Co., Cin., Ohio.
Buffalo Forge Co., Buffalo, N. Y.
Burnham, Geo. Co., Worcester, Mass.
Champion Blower and Forge Co., Lancaster, Pa.
Colburn, J. M., New Haven, Conn.
Dallett, Thos. H. & Co., Philadelphia.
Dwight Slate Machine Co., Hartford Conn.
Halsey, Jas. T., Philadelphia, Pa.
Hamilton Mch. Tool Co., Hamilton, O.
Herrick & Cowell, New Haven, Conn.
Norton & Jones Machine Tool Works, Plainville, Conn.
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Quint, A. D., Hartford, Conn.
Sellers, Wm. & Co., Phila., Pa.
Sibley & Ware, So. Ber., Ind.
Sigsbee Tool Co., Hartford, Conn.
Silver Mfg. Co., Salem, O.
Woodward & Rogers, Hartford, Conn.
- Drop Forgings.**
Belien Mac., Co., New Haven, Conn.
Billings & Spencer Co., Hartford, Conn.
Boone, W. C. Mfg. Co., Boonton, N. J.
Eccles, Richard, Auburn, N. Y.
Merrill Bros., Brooklyn, N. Y.
Miner & Peck Mfg. Co., New Haven, Ct.
Phila. Drop Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Spiers, J. C. & Co., Worcester, Mass.
Williams, J. H. & Co., Brooklyn, N. Y.
Wilmut & Hobbs Mfg. Co., Bridgeport, Conn.
Wyman & Gordon, Worcester, Mass.
- Drop Presses.**
Bliss, E. W. Co., Brooklyn, N. Y.
Crosby, G. A. & Co., Chicago, Ill.
Ferracute Mch. Co., Bridgeton, N. J.

See Alphabetical Index, Pages 125 & 126.

- Miner & Peck Mfg. Co.,** New Haven Conn.
Robinson, J. M. & Co., Cincinnati, O.
Stiles & Parker Press Co., Brooklyn, N. Y.
Union Iron Works, Chicago, Ill.
Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.
- Dumb Walters.**
Storm Mfg. Co., Newark, N. J.
- Dust Beaters.**
Peabody & Parks, Troy, N. Y.
- Dynamite.**
New York Powder Co., 62 Liberty St. N. Y.
- Dynamos.**
C. & C. Electric Co., 402 and 404 Greenwich St., N. Y.
Detroit Dynamo Co., Detroit, Mich.
Lovell Mfg. Co., Ltd., Erie, Pa.
Zucker & Levett Chemical Co., 10 & 14 Grand St., N. Y.
- Edge Tools, Makers of.**
Amer. Axe & Tool Co., 280 B'way, N. Y.
Snock Bros., Millbury, Mass.
Buffalo Edge Tool Wks., Buffalo, N. Y.
Plumb, Fayette R., Philadelphia, Pa.
Standard Axe & Tool Co., Ridgway, Pa.
White, L. & I. J. Co., Buffalo, N. Y.
- Edging Shears.**
Dille & McGuire Mfg. Co., Richmond, Ind.
- Egg Beaters.**
North Bros. Mfg. Co., Philadelphia.
- Electric Bells and Supplies.**
Ostrander, W. R. & Co., 204 Fulton St., New York
Wollensak, J. F., Chicago, Ill.
- Electric Dynamo Machines.**
Colburn Electric Mfg. Co., Fitchburg, Mass.
Eddy Electric Mfg. Co., Windsor Conn.
Hanson & Van Winkle Co., Newark, N. J.
- Elevators, Makers of.**
Link-Belt Engineering Co., Phila., Pa.
Morse, Williams & Co., Phila., Pa.
Salem Ferry & Mch. Co., Salem, Mass.
Varley Mch. Co., Warsaw, N. Y.
- Emery and Emery Wheels.**
Boil, Geo. E., 38 John St., N. Y.
Grant Corundum Wheel Mfg. Co., Worcester, Mass.
N. Y. Belting & Packing Co., Ltd., N. Y.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
- Enamels.**
Nubian Iron Enamel Co., Cragin, Ill.
- Engineers and Contractors.**
Alken Henry, Pittsburgh, Pa.
Artificial Gas Engineering Co., Pittsburgh, Pa.
Herrick, J. A., 284 Pearl St., N. Y.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex. & Co., Pittsburgh, Pa.
Lean, D. R. Co., Pittsburgh, Pa.
McClure, Amster & Co., Pittsburgh, Pa.
Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa.
Roberts, Frank C., Philadelphia, Pa.
Smythe, S. R. Co., Incorporated Pittsburgh, Pa.
Swindell, W. & Bros., Pittsburgh, Pa.
Witherow, Jas. P. Co., Pittsburgh, Pa.
- Engines, Gas.**
Outo Gas Engine Works, Phila., Pa.
Rollason Gas Engine, Havermay Bldg., N. Y.
- Engines, Steam, Makers of.**
Base Foundry & Machine Works, Ft. Wayne, Ind.
Buckeye Engine Co., Salem, O.
Erie Engine Works, Erie, Pa.
Harrisburg Fdy. & Machine Works, Harrisburg, Pa.
Lane & Bodley Co., Cincinnati, O.
Norwalk Iron Works Co., So. Norwalk, Conn.
Penna. Diamond Drill & Mfg. Co., Birdsboro, Pa.
Phila. Engineering Works, Phila., Pa.
Phoenix Iron Wks. Co., Meadville, Pa.
Shipman Engine Co., Boston, Mass.
Southward Foundry and Machine Co., Phila., Pa.
Ted, William & Co., Youngstown, O.
Wetherill, Robt. & Co., Chester, Pa.
- Exhaust Tumblers.**
Sweater, W. A., Brockton, Mass.
- Expansion Belts.**
Boone, W. C. Mfg. Co., Boonton, N. J.
Church, Isaac, Toledo, O.
Steward & Romaine Mfg. Co., Phila., Pa.
- Faucets, Self-Measuring.**
Lane Bros., Poughkeepsie, N. Y.
- Faucets, Wooden, Makers of.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
John Sommer's Son, Newark, N. J.
- Feed-Water Heaters.**
Davis, I. B. & Son, Hartford, Conn.
Goubert Mfg. Co., 32 Cortlandt St., N. Y.
Harrison Safety Boiler Wks., Phila., Pa.
National Pipe Bending Co., New Haven, Conn.
Webster, Warren & Co., Camden, N. J.
Whitlock Coil Pipe Co., Elmwood, Conn.
- Fencing, Iron and Wire.**
Sarnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Clinton Wire Cloth Co., Clinton, Mass.
Gilbert & Bennett Mfg. Co., 42 Cliff St., New York
Kilmer Mfg. Co., Newburgh, N. Y.
Maat, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
Reliance Wire & Iron Wks., Milwaukee
- Fiber Ware.**
Standard Fiber Ware Co., Mankato, Minn.
- Files, Importers of.**
Moss, F. W., 80 John, N. Y.
- Files and Rasps, Manufacturers of.**
Arcade File Works, Anderson, Ind.
Sanker & White, Troy, N. Y.
- Barnett, G. & H.,** 41 & 43 Richmond Phila.
McCauley File Co., Philadelphia.
Nicholson File Co., Providence R. I.
- Fire Brick, Makers of.**
Borgner, Cyrus, Philadelphia, Pa.
Gardner, Jas. & Son, Cumberland, Md.
Kreischer B & Sons, foot E. Houston, St.
McLeod & Henry Co., Troy, N. Y.
Maurer, J. & Son, 420 E. 23d, N. Y.
Ostrander Fire Brick Co., Troy, N. Y.
Valentine, M. D. & bro., Woodbridge.
- Fire Sets.**
Troy Nickel Works, Troy, N. Y.
- Fishing Tackle.**
Dame, Stoddard & Kendall, Boston, Mass.
- Flint and Emery Paper.**
Baeder, Adamson & Co., Phila., Pa.
- Flour Sifters.**
Meyers, F. J. Mfg. Co., Covington, Ky.
- Flue Cleaners.**
Mackey, Jas. T., St. Louis, Mo.
- Fodder Cutters.**
Silver Mfg. Co., Salem, O.
- Foreign Periodicals.**
Stechert, G. E., 810 Broadway, N. Y.
- Forges, Portable, &c.**
Bullock Bellows Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Empire Portable Forge Co., Lansingburg, N. Y.
Foss Mfg. Co., Springfield, Ohio.
sturtevant, B. F. Co., Boston, Mass.
- Forgings, Iron and Steel.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Steel-Cambria Iron Co., Johnstown, Pa.
Frankford Steel Co., Phila., Pa.
Scranton Forging Co., Scranton, Pa.
- Foundry Facings.**
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.
- Foundry Riddles.**
Eatey, W. S., 65 Fulton, N. Y.
- Foundry Supplies.**
Colliau, Victor, Detroit, Mich.
Diamond Clamp & Flask Co., Richmond, Ind.
S. Obermayer Co., Cincinnati, O.
Smith, J. D. Fdy. Supply Co., Cinn., O.
- Friction Clutches.**
Keystone Clutch & Mch. Wks., Phila., Pa.
Moore & White Co., Philadelphia, Pa.
- Friction Cone.**
Evans Friction Cone Co., Boston, Mass.
- Fruit Presses.**
Enterprise Mfg. Co., Philadelphia, Pa.
- Furnaces, Foundry.**
Byram & Co., Detroit, Mich.
- Garden Tools.**
Dunlap, C. W., Box 2703, New York
- Gas Producers.**
Wood, R. D. & Co., Philadelphia, Pa.
- Gas & Steam Fitters' Supplies.**
Panocast, Henry B. & Co., Phila., Pa.
- Gauge, Rolling Mill.**
Haines Gauge Co., Philadelphia, Pa.
- Gear Cutters.**
D. E. Whiton Mach. Co., New London, Conn.
- Gears.**
Boston Gear Works, Boston, Mass.
Poole, Robt. & Son Co., Baltimore, Md.
- Glass Boards.**
Canton Saw Co., Canton, O.
- Glass Cutters.**
Monce, S. G., Bristol, Conn.
- Glass Tubes.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
- Glue.**
Baeder, Adamson & Co., Phila., Pa.
Russia Cement Co., Gloucester, Mass.
- Grass Catchers.**
Supplee Hardware Co., Phila., Pa.
- Grinding and Polishing Machines.**
Herrick & Cowell, New Haven, Conn.
Norton Emery Wheel Co., Worcester, Mass.
Washburn Shops, Worcester, Mass.
- Grinding Mills.**
Foss Mfg. Co., Springfield, O.
- Grindstone Dressing Machinery.**
Blake & Johnson, Waterbury, Conn.
- Grindstones.**
Cleveland Stone Co., Cleveland, O.
- Gun Implements.**
Union Edw. Co., Torrington, Conn.
- Gunpowder, Makers of.**
Lafin & Rand Powder Co., 29 Murray St., N. Y.
- Hand Carts.**
Lansing Wheelbarrow Co., Lansing, Mich.
- Handles.**
Hartwell, E. B., Gallipolis, Ohio.
New York Mallet and Handle Wks., 456 E. Houston St., N. Y.
- Hangers, Door.**
Chicago Spring Butt Co., Chicago, Ill.
Colburn Trolley Track Mfg. Co., Holyoke, Mass.
Cronk Hanger Co., Elmira, N. Y.
Lane Bros., Poughkeepsie, N. Y.
Victor Mfg. Co., Newburyport, Mass.
- Hardware Comm'n Merchants.**
Doscher, Martin, 88 Chambers, N. Y.
Field, Alfred & Co., 93 Chambers St., N. Y.
Graham, John H. & Co., 111 Chambers St., New York
Jacobus, W. H., 90 Chambers, N. Y.
- Hardware Manufacturers.**
Dunlap, C. W., Box 2703, New York.
Hotchkiss, E. S., Bridgeport, Conn.
Russell & Erwin Mfg. Co., Chambers St., New York
Stearns, E. C. & Co., Syracuse, N. Y.
Union Mfg. Co., 103 Chambers, N. Y.
Yale & Towne Mfg. Co., Stamford, Conn.
- Hardware Mfrs. Agents.**
Bingham, W. Co., Cleveland, O.
Clarke, Thomas, St. John, New Brunswick.
Graham, John H. & Co., 113 Chambers, N. Y.
McCoy, Jos. F. Co., 28 Warren St., N. Y.
Sickles, Sweet & Lyon, 35 Barclay, N. Y.
- Hardware Specialties.**
Acme Shear Co., Bridgeport, Conn.
Selden Machine Co., New Haven, Conn.
Clark Mfg. Co., Buffalo, N. Y.
Empire Portable Forge Co., Lansingburg, N. Y.
Enterprise Mfg. Co., Philadelphia, Pa.
Ette & Henger Mfg. Co., St. Louis, Mo.
Gwiner Mfg. Co., Hamilton, O.
Haines & Zimmerman, Phila., Pa.
Hart, F. C. Mfg. Co., Detroit, Mich.
Hills, Edwin, Plainville, Conn.
Johnson, S. C., Racine, Wis.
Knapp & Cowles Mfg. Co., Bridgeport, Conn.
North Bros. Mfg. Co., Philadelphia, Pa.
Peabody & Parks, Troy, N. Y.
Welland, Chas., 149 Chambers St., N. Y.
Wilson, J. Fred, Worcester, Mass.
- Hardware, Yacht and Ship.**
Ferdinand, L. W. & Co., Boston, Mass.
- Harness Snaps.**
Covert Mfg. Co., West Troy, N. Y.
Coverts' Saddlery Wks., Farmer, N. Y.
Fitch, W. & E. T., New Haven, Conn.
- Hay Knives.**
Holt, Hiram, Co., E. Wilton, Me.
- Holisting Machines.**
Box, Alfred & Co., 314 Green, Phila.
Jrown Holisting & Conveying Mch. Co., Cleveland, Ohio.
Sulton Iron & Engine Wks., Detroit, Mich.
Harrington, E., Son & Co., Phila.
Lane Bros., Poughkeepsie, N. Y.
Lidgerwood Mfg. Co., 36 Liberty, N. Y.
Morris & Beekley, Philadelphia.
Moore Mfg. & Fdy. Co., Milwaukee, Wis.
Morse, Williams & Co., Phila.
Sellers, Wm. & Co., Phila. and N. Y.
Speidel, J. G., Reading, Pa.
Yale & Towne Mfg. Co., Stamford, Ct.
- Hollow Ware.**
Bronson Supply Co., Cleveland, Ohio.
Cleveland Stamping & Tool Co., Cleveland, O.
Stuart & Peterson Co., Phila., Pa.
- Hollow Ware, Aluminum.**
Illinois Pure Aluminum Co., Lemont, Ill.
- Horse and Barbers' Clippers.**
Hotchkiss, E. S., Bridgeport, Conn.
- Horse Nails, Makers of.**
Capewell Horse Nail Co., Hartford, Conn.
National Horse Nail Co., Vergennes, Vt.
Putnam Nail Co., Neponset, Boston, Mass.
- Horse and Mule Shoes, Makers of.**
Syden Horse Shoe Co., Catsanau, Pa.
Burden Iron Co., Troy, N. Y.
Crescent Horse Shoe & Iron Co., Max Meadows, Va.
Diamond State Iron Co., Wilmington, Del.
Old Dominion Iron & Nail Works Co., Richmond, Va.
Phoenix Horse Shoe Co., Poughkeepsie, N. Y.
Rhode Island Perkins Horse Shoe Co., Providence.
Shoenberger & Co., Pittsburgh, Pa.
Standard Horse Shoe Co., Boston, Mass.
- Hose.**
Cleveland Rubber Works, Cleveland, O.
N. Y. Belting & Packing Co., Ltd., 16 Park Row, N. Y.
- Hydrants, &c.**
McLean, John, 296 & 298 Monroe, N. Y.
- Hydraulic Jacks.**
Dudgeon, Richard, 24 Columbia, N. Y.
Watson & Stillman, 204 E. 43d, N. Y.
- Ice-Cream Freezers.**
Clement & Dunbar, Phila., Pa.
North Bros. Mfg. Co., Phila., Pa.
Packer, C. W., Philadelphia, Pa.
White Mountain Freezer Co., Nashua, N. H.
- Ice Dogs.**
Waller, Geo. A., Seneca Falls, N. Y.
- Injectors.**
Eyrton-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., New York
Sherwood Mfg. Co., Buffalo, N. Y.
- Insurance, Boiler.**
Hartford Steam Boiler Inspection & Insurance Co., Hartford, Conn.
- Iron and Steel, Swedish.**
Lundberg, Gustaf, Boston, Mass.
Milne, A. & Co., 1 Broadway, N. Y.
- Iron Commission Brokers.**
Cornling, Edw. & Co., 39 B'way, N. Y.
Ootton, Brad & Co., Philadelphia.
Etting, Edw. J., Philadelphia.
Hogan, John L. & Co., Philadelphia, Pa.
Hoffman, J. W. & Co., Philadelphia.
Levis, Henry & Co., Philadelphia.
Kealey, Jerome & Co., Philadelphia.
Les, J. Tatnall & Co., Philadelphia.
Mohr, J. J., 430 Walnut, Philadelphia.
Pilling & Chase, Philadelphia, Pa.
Sibell, Geo. H. & Co., Chicago, Ill.
Wister, L. & R. & Co., Phila., Pa.
- Iron Ore.**
Naylor & Co., 45 Wall, N. Y.
Pulman, J. Wesley, Phila., Pa.
Samuel, Frank, Philadelphia, Pa.
- Iron, Merchants.**
Barnes, C. K. & Co., Philadelphia, Pa.
Borden & Lovell, 70 West, N. Y.
Bussenius & Cunliffe, Philadelphia.
Cornling Edw. & Co., 29 B'way, N. Y.
Cox, Justice, Jr., Philadelphia.
Cotton, Bradley & Co., Philadelphia.
Hoffman, J. W. & Co., Philadelphia.
Leonard, J., 448 West St., N. Y.
Naylor & Co., 45 Wall St., N. Y.
Nicolls, Wheeler & Co., Philadelphia.
Ogden & Wallace, 85 Elm St., N. Y.
Pierson & Co., 29 Broadway, N. Y.
Thomson, W. H. & Co., Phila., Pa.
Wallace, Wm. H. & Co., Albany & Washington streets, N. Y.
Whitney, A. B. & Co., 17 B'way, N. Y.
Wilson, E. H. & Co., Philadelphia.
- Iron, Importers.**
Abbott Wheelock & Co., N. Y. and Boston
Lundberg, Gustaf, Boston, Mass.
- Iron, Sheet, Manufacturers of.**
Cambridge Iron & Steel Co., Cambridge Ohio
W. Dewees Wood Co., Lim., McKeesport, Pa.
- Ironwork, Ornamental.**
Barnum, E. T., Detroit, Mich.
Champion Iron Co., Kenton, O.
Lange Fence & Wire Co., St. Louis, Mo.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Maat, Foss & Co., Springfield, O.
The Van Dorn Iron Works Co., Cleveland, O.
- Keys.**
Wollensak, J. F., Chicago, Ill.
- Ladders, Rolling.**
Colburn Trolley Track Mfg. Co., Holyoke, Mass.
- Ladies.**
Detroit Fdy. Equipment Co., Detroit, Mich.
- Lamp Stoves.**
Glazier Stove Co., Chelsea, Mich.
- Lamps.**
Standard Lighting Co., Cleveland, O.
- Lanterns.**
Ohio Lantern Co., Tiffin, Ohio.
Stearns Gauge & Lantern Co., Syracuse, N. Y.
- Lathes.**
Draper Machine Tool Co., Worcester, Mass.
Johnson, Israel H., Jr., & Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Lathing, Wire.**
Clinton Wire Cloth Co., Clinton, Mass.
N. J. Wire Cloth Co., Trenton, N. J.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Lawn Mowers.**
Chadborn & Coldwell Mfg. Co., Newburgh, N. Y.
Champion Mfg. Co., Richmond, Ind.
Coldwell Lawn Mower Co., Newburgh, N. Y.
Dille & Anderson, Richmond, Ind.
Dille & McGuire Mfg. Co., Richmond, Ind.
F. & N. Mfg. Co., Richmond, Ind.
Henley, M. C., Richmond, Ind.
Maat, Foss & Co., Springfield, O.
Stearns, E. C. & Co., Syracuse, N. Y.
Supplee Edw. Co., Phila., Pa.
- Lawn Rakes.**
Gibbs Mfg. Co., Canton, Ohio.
Konler, F. E. & Co., Canton, O.
Schaeffer & Co., Dayton, Ohio.
Syracuse Specialty Mfg. Co., Syracuse, N. Y.
- Lawn Sprinklers.**
Ette & Henger Mfg. Co., St. Louis.
Gibbs Mfg. Co., Canton, Ohio.
McGowan, John H. Co., Cincinnati, O.
- Leather Parts.**
Greene, J. Frank & Co., 276 Water St. New York.
- Lemon Squeezers.**
Ripley Mfg. Co., Unionville, Conn.
- Letters and Figures, Metallic.**
White, A. A. & Co., Providence, R. I.
- Letters, Paper.**
Tablet & Ticket Co., Chicago, Ill.
- Levels.**
Davis & Cook, Watertown, N. Y.
Richardson, O. F., & Son Athol, Mass.
- Locks & Knobs, Manufacturers of.**
Deits, A. E., 97 Chambers, N. Y.
Keyless Lock Co., Chicago, Ill.
Reading Hdw. Co., Reading, Pa.
Romer & Co., Newark, N. J.
Russell & Erwin Mfg. Co., New York.
Smith & Egge Mfg. Co., Bridgeport, Conn.
Yale & Towne Mfg. Co., Stamford, Conn.

See Alphabetical Index, Pages 125 & 126.

Machinery.

Arm. Tool Works, Cleveland, Ohio.
 Barnes, W. F. & John, Rockford, Ill.
 Sement, M. & Co., Philadelphia, Pa.
 Sigelow, C. E., 45 Day, N. Y.
 Bignall & Keeler Mfg. Co., St. Louis.
 Birmingham Iron Foundry, Birmingham, Ala.
 Bliss, E. W. Co., Brooklyn, N. Y.
 Bojert, Jno. L., Flushing, N. Y.
 Briggs, Marvin, 12 Broadway, N. Y.
 Carl's Sons, Thos., Allegheny, Pa.
 Olm, Milling Mch. Co., Cincinnati, Ohio.
 Clapp, Geo. M., agt., 74 Cortlandt, N. Y.
 Coulter & McKensie Mch. Co., Bridgeport, Conn.
 Detroit & Harvey Mch. Co., Baltimore, Md.
 Fitchburg Mch. Works, Fitchburg, Mass.
 Garvin Mch. Co., Laight & Canal Sts.
 Gould & Eberhardt, Newark, N. J.
 Hamilton Mch. Tool Co., Hamilton, O.
 Harrington, E. Son & Co., Phila. Pa.
 Henderer, A. L., Wilmington, Del.
 Hendey Machine Co., Torrington, Ct.
 Hendey Mch. Tool Wks., Remondens Ind., Hill, Clarke & Co., Boston, Mass.
 Johnson, Israel H., Jr., & Co., Phila.
 Jones & Lamson Mch. Co., Springfield, Vt.
 Lovegrove & Co., Philadelphia, Pa.
 McCabe, J. J., 68 Cortlandt, N. Y.
 Machinery Supply Co., Rochester, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Conn.
 National Machinery Co., Tiffin, Ohio.
 Newark Mch. Tool Works, New ark, N. J.
 New Haven Mfg. Co., New Haven, Conn.
 New York Mach'y Depot, N. Y.
 Niles Tool Wks., 188 Liberty St., N. Y.
 Pittsburgh Mfg. Co., Pittsburgh, Pa.
 Place, Geo., 120 Broadway, N. Y.
 Poole, Robt. & Son Co., Baltimore, Md.
 Powell Planer Co., Worcester, Mass.
 Pratt & Whitney Co., Hartford, Conn.
 Scrantias Tool & Supply Co., N. Y.
 Scranton Supply & Mch'y Co., Scranton, Pa.
 Sellers, Wm. & Co., Phila.
 Seyfert's Sons L. F., Philadelphia, Pa.
 Steptoe, J. & Co., Cincinnati, O.
 Stow Flexible Shaft Co., Ltd., Phila.
 Toomey, Frank, Philadelphia, Pa.
 Wetherill, Robert & Co., Chester, Pa.
 Wilson, W. A., Rochester, N. Y.

Machinery for Hardware Manufacture.

Adt, Jno. & Son, New Haven, Conn.

Machine Knives.

Loring Coes & Co., Worcester, Mass.
 Loyd, John, 558-562 Water St., N. Y.

Machine Tools.—See Machinery.**Machine Work.**

Papping, J., 58th St., & 11th Ave., N. Y. City.

Machinists' Scales.

Coffin & Leighton, Syracuse, N. Y.
 Stewart, L. S., Athol, Mass.
 Valentine Tool Co., Hartford, Conn.

Machinists' Tools and Supplies.

King, J. M. & Co., Waterford, N. Y.
 Sellers, Wm. & Co., Inc., Phila.

Mallets.

N. Y. Mallet & Handle Works, N. Y.

Manufacturing Sites.

Chicago, Milwaukee & St. Paul R. R., Chicago, Ill.

Measuring Tapes.

Keuffel & Esser Co., 127 Fulton St., N. Y.
 Lufkin Rule Co., Saginaw, Mich.

Meat Cutters and Stuffers.

Enterprise Mfg. Co., Philadelphia, Pa.

Mechanical Instruction.

Correspondence School of Mechanics
 Scranton, Pa.

Metals.

Fearing, Wm. S., 100 Chambers, N. Y.
 Hendricks Bros., 49 Cliff, N. Y.
 Naylor & Co., 45 Wall, N. Y.

Metal Brokers.

American Metal Co., N. Y.

Metallogists.

Britton J. Blodgett, Phila.

Milling Machines.

Olh, Milling Mch. Co., Cincinnati, Ohio.

Mining Knives.

Palmer Hdw. Mfg. Co., Troy, N. Y.

Mine Lamps.

Darby, Edw. & Sons Phila. Pa.
 Leonard, B. E., Scranton, Pa.

Mining Screens.

Harrington & King Perforating Co.
 Chicago, Ill.
 Howard & Morse, 45 Fulton, N. Y.

Mirrors.

Rice, C. F., Chicago, Ill.

Models, Makers of.

Franklin, H. H. Mfg. Co., Syracuse, N. Y.

Molding Sand.

Obermayer, S. Co., Cincinnati, O.

Motors, Water and Electric.

C. & C. Electric Co., 402 and 404
 Greenwich St., N. Y.
 Dallett, Thos. H. & Co., Phila., Pa.

Nail Machinery.

Pittsburgh Mfg. Co., Pittsburgh, Pa.

Nails (Cut) and Spikes.

Borden & Lovell, 70 West, N. Y.
 Cumberland Nail and Iron Co., Phila.
 Oxford Iron Co., 81 Washington,
 Pottstown Iron Co., Pottstown, Pa.
 Riverside Iron Wks., Wheeling, W. Va.

Neck Yokes.

Johnson, S. C., Racine, Wis.

Nickel Platers' Supplies.

Colburn Electric Mfg. Co., Fitchburg, Mass.
 Eddy Electric Mfg. Co., Windsor, Conn.
 Hanson & Van Winkle Co., Newark, N. J.
 Zucker & Levett Chemical Company,
 10 to 14 Grand St., N. Y.

Nerway Shapes, Rollers of.

Rowland, William & Harvey, Framford, Philadelphia

Novelty Manufacturers.

Franklin, H. H. Mfg., Syracuse, N. Y.

Nut Machines.

Dunham Nut Mch. Co., Unionville, O.

Nuts, Bolts, &c., Makers of.

American Bolt Co., Lowell, Mass.
 American Screw Co., Providence, R. I.
 Blake & Johnson, Waterbury, Conn.
 Haskell, Wm. H. Co., Pawtucket, R. I.
 Mt. Carmel Bolt Co., Mt. Carmel, Conn.
 Port Chester Bolt and Nut Co., Chester, N. Y.
 Russell, Burdall & Ward, Port Chester, N. Y.
 Sternberg, J. H. & Son, Reading, Pa.
 Wilson, J. Fred., Worcester, Mass.
 Wm. H. Haskell Co., Pawtucket, R. I.

Oil Cups and Lubricators.

Sherwood Mfg. Co., Buffalo, N. Y.

Oilers.

Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

Oil Stones.

Pike Mfg. Co., Pike Station, N. H.

Oil Stoves.

Glazier Stove Co., Chelsea, Mich.

Orange Shears.

Henry, J. T., Mfg. Co., Hamden, Conn.

Ores.

Wister, Francis, Philadelphia, Pa.

Or Shoes.

Scranton Forging Co., Scranton, Pa.

Packing.

Morrison, Robt., St. Louis, Mo.
 N. Y. Beltine & Packing Co. Ltd., N. Y.

Padlocks.

Ames Sword Co., Chicopee, Mass.
 Frahm, E. T., Lancaster, Pa.
 Hillebrand & Wolf, Phila., Pa.
 Miller Lock Co., Philadelphia, Pa.

Paint.

Dixon, Jos. Crucible Co., Jersey City, N. J.
 Garry Iron & Steel Roofing Co., Cleveland, O.

Paint Burners.

Dangler Stove & Mfg. Co., Cleveland, O.

Paint Cans.

Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

Pants Stretcher.

Covert Mfg. Co., West Troy, N. Y.

Patent Solicitors.

Henson & Henson, Phila. & Wash'gton.
 Jenner, H. W. T., Washington, D. C.
 Stocking, E. B., Washington, D. C.

Peanut and Coffee Roaster.

Olsen, A. B., Kansas City, Mo.

Perforated Metal.

Clinton Wire Cloth Co., Clinton, Mass.
 Harrington & King Perforating Co., Chicago, Ill.
 Hendrick Mfg. Co., Ltd., Carbondale, Pa.

Phosphor Bronze.

Phosphor Bronze Smelting Co., Limited, 512 Arch, Philadelphia.

Phosphor Tin.

Crescent Phosphorized Metal Co., Philadelphia, Pa.
 Crosby Steam Gage & Valve Co., Boston, Mass.
 Haik & Naumann, 616 Pearl, N. Y.

Picks and Mattocks.

Piamb, Fayette R., Philadelphia, Pa.

Pig Iron.

Houston, C. B. & Co., Philadelphia, Pa.
 Montour Iron & Steel Co., Danville, Pa.
 Naylor & Co., 45 Wall, N. Y.
 Pilling & Crane, Philadelphia, Pa.
 Samuel, Frank, Philadelphia, Pa.

Pig Iron Storage.

Am. Pig Iron Storage Warrant Co., 44 Wall, N. Y.

Pile Drivers.

Vulcan Iron Wks., Chicago, Ill.

Pipe Bent.

National Pipe Bending Co., New Haven

Pipe Cutting and Threading Machines.

Bignall & Keeler Mfg. Co., St. Louis, Mo.
 Merrill Mfg. Co., Toledo, O.
 Pancoast Henry B. & Co., Philadelphia.
 Sauder's Sons, D., Yonkers, N. Y.

Pipe Grips.

Freudtiss Vise Co., 44 Barclay, N. Y.

Pipes, Fittings, &c., Makers of.

McNab & Harlin Mfg. Co., N. Y.

Pipe, Water and Gas, Makers of.

Cumberland Nail and Iron Co., Phila. Pa.
 Donaldson Iron Co., Emsau, Pa.
 Riverside Iron Works, Wheeling, W. Va.
 Wood, R. D. & Co., Philadelphia, Pa.

Plane Irons, Manufacturers of.

Buck Bros., Millbury, Mass.

Planes, Manufacturers of.

Stanley Rule & Level Co., N. Y.

Plated Ware.

Boarman L. & Son, New Bedford, Ct.
 Holmes & Edwards Silver Co., Bridgeport, Conn.
 Rogers, Wm. Mfg. Co., Hartford, Ct.
 Rogers & Hamilton, Waterbury, Ct.
 Upson & Hart Co., Unionville, Ct.

Plate, Iron and Steel, Mfrs of.

Stna-Standard Iron & Steel Co., Bridgeport, O.
 Lukens Iron & Steel Co., Coatesville, Pa.

Mahoning Valley Iron Co., Youngstown, Ohio.
 Moorhead-McLean Co., Pittsburgh, Pa.
 McVain & Sons, Reading, Pa.
 Pottstown Iron Co., Pottstown, Pa.
 Pottsville Iron & Steel Co., Pottsville, Pa.
 Singer, Nimick & Co., Pittsburgh, Pa.
 The Mahoning Valley Iron Co., Youngstown, O.
 Wellman Iron & Steel Co., Thurlow, Pa.
 Wood Alan Co., Philadelphia.

Plating, Nickel, Brass and Silver.

Wilmet & Hobbs Mfg. Co., Bridgeport, Conn.

Pokers and Lifters.

Troy Nickel Works, Troy, N. Y.

Polishing Machines.

Watson & Stillman, 204 E. 43d, N. Y.

Polishing Wheel.

La Massena, C. E. & Co., Newark, N. J.

Post Hole Diggers.

Gibbs Mfg. Co., Canton, Ohio.
 Buckeye Mfg. Co., Union City, Ind.
 Wister, L. & R. & Co., Philadelphia, Pa.

Pot and Kettle Cleaner.

Unisinger Mfg. Co., Fremont, Ohio.

Poultry Nettings.

Barnum, E. T., Detroit, Mich.
 Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
 N. J. Wire Cloth Co., Trenton, N. J.

Puller Wire Wks. Co., W. S., Cleveland, O.

Wright & Colton Wire Cloth Co., Worcester, Mass.

Powder.

Lafin & Rand Powder Co., 29 Murray
 New York Powder Co., 62 Liberty St., N. Y.

Power Hack Saws.

Millers Falls Co., 93 Reade St., N. Y.

Pewer Hammers.

Belden Mach. Co., New Haven, Conn.
 Diemel & Eisenhardt, Philadelphia.
 Jenkins & Lingie, Bellefonte, Pa.

Presses, Dies, &c.

E. W. Bliss Co., Brooklyn, N. Y.
 Crosby, G. A. & Co., Chicago, Ill.
 Ferracute Mch. Co., Bridgeton, N. J.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.
 Waterbury Mch. Co., Waterbury, Conn.

Presses, Power, Makers of.

Bliss, E. W. Co., Brooklyn, N. Y.
 Manville, E. J. Mch. Co., Waterbury, Ct.
 Merriam, H. M., Meriden, Conn.
 Robinson, J. M. & Co., Cincinnati, O.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Waterbury Farrel Foundry and Machine Co., Waterbury, Conn.

Pulleys.

Keystone Clutch Mch. Wks., Phila., Pa.
 Lake, J. H. & D. Co., Massillon, Ohio.
 Reeves Pulley Co., Columbus, Ind.

Pulley Fixings.

Foley, J. W. & Co., Cincinnati, O.

Pulverizing Mill.

Bradley Fertilizer Co., Boston, Mass.

Pumping Machinery.

Coulter & McKenzie Mch. Co., Bridgeport, Conn.
 Dean Bros. Steam Pump Works, Indianapolis, Ind.
 Hooker-Corlville Steam Pump Co., Chicago, Ill.
 Lucas, G. & Co., Greenville, Ohio.
 Jaggowan, J. B. & Co., Cincinnati, O.
 Maslin, J. & Son, Jersey City, N. J.
 Norwalk Iron Wks. Co., So. Norwalk, Conn.
 Southwark Fdy. & Mch. Co., Phila., Pa.
 Valley Pump Wks., Easthampton, Mass.
 Worthington, Henry R., 86 & 88 Liberty St., N. Y.

Pumps, Makers of.

Bellevue Pump Co., Bellevue, Iowa.
 Deming Co., Salem, O.
 Douglas, W. & B., Middletown, Conn.
 Mast, Foss & Co., Springfield, O.
 Myers, F. E. & Bro., Ashland, O.

Punches and Shears, Hand and Power.

Bertsch & Co., Cambridge City, Ind.
 E. W. Bliss Co., Brooklyn, N. Y.
 Cockburn Barrow & Mch. Co., Jersey City, N. J.
 Crosby, G. A. & Co., Chicago, Ill.
 Ferracute Mch. Co., Bridgeton, N. J.
 Henderer, A. L., Wilmington, Del.
 Robinson, J. M. & Co., Cinn., Ohio.
 Stark Mch. & Tool Co., Buffalo, N. Y.
 Stiles & Parker Press Co., Brooklyn, N. Y.

Waterbury Farrel Foundry and Mch. Co., Waterbury, Conn.

Watson & Stillman, 204 E. 43d, N. Y.

Rails, Old and New.

Ferry, W. H. & Co., Providence, R. I.

Rat and Mouse Traps.

Burditt & Williams, Boston, Mass.
 Estey, W. S., 65 Fulton, N. Y.
 Ripley Mfg. Co., Unionville, Conn.
 Sun Mfg. Co., Greenfield, O.

Razors.

Electric Cutlery Co., 113 Chambers, N. Y.
 J. A. Torrey Razor Co., Worcester, Mass.

Reels.

Hendryx, A. B. Co., New Haven, Conn.

Refrigerator Door Fasteners.

Conroy, F. J. & Co., Philadelphia.

Rivets.

Blake & Johnson, Waterbury, Conn.
 Boyce Rivet Co., Muncie, Ind.
 Burden Iron Co., Troy, N. Y.
 Cobb & Drew, Plymouth, Mass.
 Henderson, Jas. S., 165 Greenwich, N. Y.
 New England Screw Co., Boston, Mass.
 Sternberg, J. H. & Son, Reading, Pa.
 Townsend, W. F. & Co., New Brighton, Pa.

Riveting Machines.

Adt, Jno. & Son, New Haven, Conn.

Rock Drills.

Sand Drill Co., 23 Park Place, N. Y.

Rolling Mill Machinery.

Birmingham Iron Fdry, Birmingham, Conn.
 Booth, The Lloyd, Co., Youngstown, O.
 Leechburg Foundry & Mch. Co., Pittsburgh, Pa.
 Mahoning Fdry & Mch. Co., Danville, Pa.
 Morgan Construction Co., Worcester, Mass.

Robinson-Rea Mfg. Co., Pittsburgh.

Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.
 Trethewey Mfg. Co., Pittsburgh, Pa.
 Waterbury Farrel Foundry & Mch. Co., Waterbury, Conn.

Roll Lathes.

Totten & Hogg Iron & Steel Fdry Co., Pittsburgh, Pa.

Rolls, Chilled, Sand and Steel.

Booth, The Lloyd, Co., Youngstown, O.
 Garrison, A. Fdry. Co., Pittsburgh, Pa.
 Seaman, Sleeth & Black, Pittsburgh.
 Totten & Hogg Iron and Steel Fdry Co., Pittsburgh, Pa.

Roofing.

Berlin Iron Bridge Co., E. Berlin, Conn.
 Boston Bridge Works, Boston, Mass.
 Cambridge Roofing Co., Cambridge, O.
 Cincinnati Corrugating Co., Piqua, O.
 Johns, H. W. Mfg. Co., 87 Maiden Lane

Rope and Web Goods.

Covert Mfg. Co., West Troy, N. Y.
 Covert's Saddlery Wks., Farmer, N. Y.

Rope Wheels.

Cresson, Geo. V. Co., Philadelphia, Pa.

Rubber Goods.

Campfield, H. O., Bridgeport, Conn.

Rules, Manufacturers of.

Keuffel & Esser Co., 127 Fulton St., N. Y.
 Lufkin Rule Co., Saginaw, Mich.
 Standard Tool Co., Athol, Mass.
 Stanley Rule & Level Co., 29 Chambers,

Rust Preventive.

erie, Sport Gun Implement Co., 313-315 Broadway, N. Y.

Sad Irons.

Enterprise Mfg. Co., Philadelphia, Pa.

Sand Paper.

Baeder, Adamson & Co., Phila., Pa.

Sash Balances.

- Allentown Rolling Mill.** Allentown, Pa.
Lockhart Iron & Steel Co., Pittsburg, Pa.
Passaic Rolling Mill Co., Paterson, N.J.
Pottsville Iron & Steel Co., Pottsville, Pa.
Roberts, A. & P. & Co., Phila., Pa.
The Phoenix Iron Co., Phila., Pa.
Tudor Iron Works, St. Louis, Mo.
- Shears and Scissors.**
Acme Shear Co., Bridgeport, Conn.
Heinrichs, R. Sons Co., Newark, N. J.
- Sheet Iron and Steel, Manufacturers of.**
Etna-Standard Iron and Steel Co., Bridgeport, O.
Cambridge Iron & Steel Co., Cambridge, Ohio.
Chess Bros., Pittsburgh, Pa.
Mahoning Valley Iron Co., Livingston, Ohio.
Moorehead-McCleane Co., Pittsburgh, Pa.
Pierson & Co., 29 Broadway, N. Y.
Singer, Nimick & Co., Ltd., Pittsburgh, Pa.
The Mahoning Valley Iron Co., Youngstown, O.
Alan Wood Co., Philadelphia.
W. Dewees Wood Co., McKeesport, Pa.
- Sheet Metal Work.**
Clark & Cowles, Plainville, Conn.
- Sheet Zinc.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Shelf Brackets.**
Koch, A. B. & Co., Peoria, Ill.
- Shipping Blanks.**
Barlow Bros., Grand Rapids, Mich.
- Sinks.**
Douglas, W. & B., Middletown, Conn.
- Skates, Ice.**
Barney & Berry, Springfield, Mass.
Dame, Stoddard & Kendall, Boston, Mass.
Lovell, Jno. P. Arms Co., Boston, Mass.
Sickels, Sweet & Lyon, 35 Barclay St., N. Y.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Skates, Roller.**
Barney & Berry, Springfield, Mass.
Henley, M. C., Richmond, Ind.
Union Hardware Co., Torrington, Conn.
Winslow, Sam'l, Skate Mfg. Co., Worcester, Mass.
- Smelting Works.**
Reeves, Paul S., 760 S. Broad, Phila.
- Soldering Coppers.**
Clendenin Bros., Baltimore, Md.
Covert Mfg Co., West Troy, N. Y.
- Speaking Tubes.**
Ostrander, W. R. & Co., 204 Fulton St., N. Y.
Wollensak, J. F., Chicago, Ill.
- Specialties, Pat. Articles.**
Konigslow, O., Cleveland, O.
- Spelter.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Spoons and Forks.**
Boardman, L. & Son, New Haddam, Conn.
Holmes & Edwards Silver Co., Bridgeport, Conn.
Rogers, The Wm. Mfg. Co., Hartford, Conn.
Rogers & Hamilton Co., Waterbury, Conn.
Upson & Hart Co., Unionville, Ct.
- Sporting Goods.**
Hartley & Graham, 813-815 B'way, N. Y.
- Spring Hinges.**
Cary, Alanson, 240-242 W. 29th St., N. Y.
Dunbar Bros., Bristol, Conn.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
Nourse, Fred. Co., 315 to 319 E. 22d St., N. Y.
Roland, Wm. & Harvey, Phila., Pa.
Sabin Machine Co., Montpelier, Vt.
Washburn & Moen Mfg. Co., Worcester, Mass.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
- Stamping Ware.**
Am. Stamping Co., 104 & 106 John St., New York.
- Stamping Works.**
Cleveland Stamping & Tool Co., Cleveland, O.
- Staples.**
Cobb & Drew, Plymouth, Mass.
Titchener E. H. & Co., Binghamton, N. Y.
- Steam Gauges.**
Ashcroft Mfg. Co., 111 Liberty St., N. Y.
Bristols Mfg. Co., Waterbury, Conn.
- Steam Hammers, &c., Makers of.**
Dionet & Eisenhardt, Philadelphia.
Dudgeon, Richard, 24 Columbia Street, N. Y.
Trethewey Mfg. Co., Pittsburgh, Pa.
- Steam Heating.**
Webster Warren & Co., Camden, N. J.
- Steam Separators.**
Goubert Mfg. Co., 32 Cortland St. N. Y.
Harrison Safety Boiler Wks., Phila. Pa.
- Steel, Cold Rolled Strip.**
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel Figures and Alphabets.**
Hoefig, C. W., 53 Fulton St., N. Y.
Krosrud, W., 81 Fulton St., N. Y.
Wolff, C. H., 177 William St., N. Y.
- Steel Importers.**
Abbott, Wheelock & Co., N. Y. and Boston.
Hobson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 81 John, N. Y.
Milne, A. & Co., 1 Bridge St., N. Y.
Newton & Shipman, 83 John, N. Y.
Wetherell Bros., 93 Liberty St., N. Y.
Whitney, A. R. & Co., B'way, N. Y.
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Steel (Mushet's Special).**
Jones, B. M. & Co., Boston.
- Steel Manufacturers.**
Etna-Standard Iron & Steel Co., Bridgeport, O.
Bethlehem Iron Co., S. Bethlehem, Pa.
Baker, Herman & Co., 103 Duane St.
Carbon Steel Co., Pittsburgh, Pa.
Ochester Steel Castings Co., Phila., Pa.
Chrome Steel Works, Brooklyn, N. Y.
Crescent Steel Co., Pittsburgh, Pa.
Elken & Co., Hazen, Germany.
Frankford Steel Co., Philadelphia.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Hobson, Francis, Seaman & Co., 9 John St., N. Y.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 81 John, N. Y.
Kayser, Ellison & Co., Sheffield, Eng. land, or 81 John, N. Y.
La Belle Steel Co., Pittsburgh, Pa.
Lukens Iron & Steel Co., Coatesville, Pa.
Moorehead-McCleane Co., Pittsburgh, Pa.
Moss, F. W., 83 John N. Y.
Naylor & Co., 45 Wall, N. Y.
Pottsville Iron and Steel Co., Pottsville, Pa.
Roland, Wm. & Harvey, Frankford Philadelphia.
Singer, Nimick & Co., Pittsburgh.
Stanley Works, New Britain, Conn.
Steel & Iron Improvement Co., Pittsburgh, Pa.
Taylor Iron & Steel Co., High Bridge, N. J.
Wardlaw, S. & C., Sheffield, Eng.
Wetherell Bros., Liberty, N. Y.
Wilmot & Hobbs Mfg. Co., Bridgeport, Conn.
- Steel, Manufacturers' Agents.**
Barnes, C. K. & Co., Philadelphia, Pa.
Corning, Edw. & Co., 29 B'way, N. Y.
Frassco Co., 19 Warren St., New York.
Lindsay, Jas. G. & Co., Phila., Pa.
Pierson & Co., 29 Broadway, N. Y.
- Steel Rails, Manufacturers of.**
Bethlehem Iron Co., S. Bethlehem, Pa.
Cambria Iron Co., Johnstown, Pa.
Montour Iron & Steel Co., Danville, Pa.
Riverside Iron Wks., Wheeling, W. Va.
- Steel, Tools.**
Frankford Steel Co., Philadelphia, Pa.
Jessop, Wm. & Sons, Sheffield, Eng. land, or 81 John, N. Y.
Jones, B. M. & Co., Boston, Mass.
La Belle Steel Co., Pittsburgh, Pa.
- Step Ladders.**
Bicycle Step Ladder Co., Chicago, Ill.
Croissant, M., Albany, N. Y.
- Stocks and Dies.**
Armstrong Mfg. Co., Bridgeport, Conn.
Billings & Spencer Co., Hartford, Conn.
Butterfield & Co., Derby Line, Vt.
Hart Mfg. Co., Cleveland, O.
Sander's Sons, D., Yonkers, N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Stove Linings.**
Ostrander Fire Brick Co., Troy, N. Y.
- Stove Pipe Thimbles.**
Cheney, S. & Son Manlius, N. Y.
- Stove Trimmings.**
Troy Nickel Works, Troy, N. Y.
- Stove Trucks.**
Gwinner Mfg. Co., Hamilton, O.
- Street Lamps.**
Steam Gauge & Lantern Co., Syracuse, N. Y.
- Strops.**
Electric Outlery Co., 113 Chambers, N. Y.
J. R. Torrey & Co., Worcester, Mass.
- Structural Iron Work.**
Berlin Iron Bridge Co., East Berlin, Conn.
Boston Bridge Wks., Boston, Mass.
Lindsay, Jas. G. & Co., Phila., Pa.
Wrought Iron Bridge Co., Canton, O.
- Sulphuric Acid.**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
- Tacks, Brads, Staples, &c.**
Atlas Tack Corporation, Boston, Mass.
Clendenin Bros., Baltimore, Md.
Cobb & Drew, Plymouth, Mass.
Grand Crossing Tack Co., Grand Crossing, Ill.
Nat. Screw & Tack Co., Cleveland, O.
Phillips, E. & Sons, South Hanover.
Trafant, W. E., Whitman, Mass.
- Tags and Dies.**
Butterfield & Co., Derby Line, Vt.
Carpenter, J. M., Tap & Die Co., Pawtucket, R. I.
Manning, Maxwell & Moore, 111 Liberty St., N. Y.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Testing Laboratories.**
Riehle Bros. Testing Mch. Co., Philadelphia.
- Testing Machines.**
Riehle Bros. Testing Mch. Co., Phila.
- Theatrical Hardware.**
Wollensak, J. F., Chicago, Ill.
- Thill Springs.**
Frost Thill Spring Co., Boston, Mass.
Sabin Machine Co., Montpelier, Vt.
- Time Record.**
Scattergood, H. W., Phila., Pa.
- Tinners' Hardware.**
Berger Bros., Philadelphia, Pa.
- Tin Plate Machinery.**
Lloyd Booth Co., Youngtown, Ohio.
- Tinware.**
Am. Stamping Co., 104 & 106 John St., N. Y.
- Tire Upsetters.**
Butts & Ordway, Boston, Mass.
- Toe Calks, Steel.**
Burke, P. F., Boston, Mass.
- Tool Chests.**
Am. Tool Co., 200 W. Houston St., N. Y.
- Tools.**
Britton, Horace E., Stoughton, Mass.
Brown, R. H. & Co., New Haven, Conn.
Frassco Co., 19 Warren St., New York.
Fray, Jno S. & Co., Bridgeport, Conn.
Mayhew, H. H. Co., Shelburne Falls, Mass.
Milvere Falls Co., 93 Reade, N. Y.
Richardson, G. F. & Son, Athol, Mass.
Standard Tool Co., Athol, Mass.
Stanley Rule & Level Co., 29 Chambers, Stretet, L. S., Athol, Mass.
Tower & Lyon, 95 Chambers St., N. Y.
- Tools, Blacksmith and Wheelwrights.**
Buffalo Forge Co., Buffalo, N. Y.
Butts & Ordway Boston, Mass.
Champion Blower & Forge Co., Lancaster, Pa.
Plumb, Fayette R., Philadelphia, Pa.
Wiley & Russell Mfg. Co., Greenfield, Mass.
- Tools, Steam and Gas Fitters'.**
Saunders' Sons, D., Yonkers, N. Y.
- Torches, Oil and Gasoline.**
Danier Stove & Mfg. Co., Cleveland, O.
Schneider & Trenkamp Co., Cleveland, Ohio.
Standard Lighting Co., Cleveland, O.
- Transom Lifters.**
Wollensak, J. F. Chicago, Ill.
- Trucks, Manufacturers of.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Clark, G. P., Windsor Locks, Conn.
Lansing Wheelbarrow Co., Lansing, Mich.
- Tubes, Seamless Drawn Copper.**
Ansonia Brass & Copper Co., 19 and 21 Cliff, N. Y.
Randolph & Clowes, Waterbury, Conn.
- Tubes, Steel.**
Ellwood Shafting & Tube Co., Ellwood City, Pa.
Leng's John S. Son & Co., 4 Fletcher St., New York.
Shelby Steel Tube Co., Shelby, O.
- Turnbuckles.**
Central Iron & Steel Co., Brazil, Ind.
Cleveland City Forge & Iron Co., Cleveland, O.
Merrill Bros., Brooklyn, E. D.
- Twist Drills, Makers of.**
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Machine Co., New Bedford, Mass.
New Process Twist Drill Co., Taunton, Mass.
Standard Tool Co., Cleveland.
- Valves, Gas, Water and Steam.**
Best, Fox & Co., Pittsburgh, Pa.
Chapman Valve Mfg. Co., Boston.
Eynon-Evans Mfg. Co., Philadelphia, Pa.
Jenkins Bros., 71 John, N. Y.
McNab & Harlin Mfg. Co., 56 John N. Y.
Mason Regulator Co., Boston, Mass.
- Ventilating Fans.**
Euyett & Smith Mfg. Co., Detroit, Mich.
- Ventilator Appliances.**
Howard & Morse, 45 Fulton, N. Y.
- Vise Jaws.**
Newark Mch. Tool Co., Newark, N. J.
- Vises.**
Capital Mch. Tool Co., Auburn, N. Y.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Millers Falls Co., 93 Reade St., N. Y.
Prentiss Vise Co., 44 Barclay N. Y.
Tower & Lyon, 95 Chambers St., N. Y.
Van Wagoner & Williams Co., 14 Warren St., N. Y.
- Wagon Jacks.**
Boston & Lockport Block Co., Boston, Mass., and Lockport, N. Y.
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
- Washers.**
Haskell, Wm. H. Co., Pawtucket, R. I.
Milton Mfg. Co., Milton, Pa.
Sternbergh, J. H. & Son, Reading, Pa.
- Water Meters.**
Worthington, Henry R., 86 & 88 Liberty St., N. Y.
- Water Wheels.**
Pool, Robt. & Son Co., Baltimore, Md.
- Weather Strips.**
Thomas, Jno. H. Mfg. Co., Piqua, Ohio.
- Wheelbarrows.**
Amer. Steel Scraper Co., Sidney, Ohio.
- Cockburn Barrow & Mch. Co.,** Jersey City, N. J.
Kilbourne & Jacobs Mfg. Co., Columbus, Ohio.
Lansing Wheelbarrow Co., Lansing, Mich.
Sidney Steel Scraper Co., Sidney, O.
Toledo Wheelbarrow Works, Toledo, Ohio.
- Wheels.**
Arnold Metal Wheel Co., New London, Ohio.
- Whips.**
American Whip Co., Westfield, Mass.
- Window Cord, Makers of.**
Samson Cordage Works, Boston, Mass.
- Wire, Manufacturers of.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Gautier Steel Department of Cambria Iron Co., Johnstown, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
New Haven Wire Mfg. Co., New Haven, Conn.
Salem Wire Nail Co., Salem, O.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester.
Wetherell Bros., 93 Liberty St., N. Y.
Wolff, R. H. & Co., Ltd., 118th St. and Harlem River, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
- Wire Cloth.**
Barnum, E. T., Detroit, Mich.
Clinton Wire Cloth Co., Clinton, Mass.
Darby, Edward & Sons, Philadelphia.
Estey, W. B., 65 Fulton, N. Y.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Howard & Morse, 45 Fulton, N. Y.
N. J. Wire Cloth Co., Trenton, N. J.
Reliance Wire & Iron Wks., Milwaukee, Wis.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.
W. S. Tyler Wire Works Co., Cleve'd.
- Wire Cutters.**
Cronk Hanger Co., Elmira, N. Y.
Higginum Hdw. Co., Higgaum, Conn.
King, J. M. & Co., Watertown, N. Y.
- Wire Dies.**
McFarland, Wm., Trenton, N. J.
Newton & Shipman, 83 John, N. Y.
- Wire Fences.—See Fencing, Iron and Wire.**
- Wire Goods, Manufacturers of.**
Darby, Edward & Sons, Phila.
Gilbert & Bennett Mfg. Co., 42 Cliff St., N. Y.
Langze Fence & Wire Co., St. Louis, Mo.
Ludlow-Saylor Wire Co., St. Louis.
Ossawan Mills Co., Norwich, Conn.
Scheeler & Sons, Buffalo, N. Y.
Wickwire Bros., Cortland, N. Y.
Williamson, C. T. Wire Novelty Co., Newark, N. J.
- Wire Machinery.**
Am. Tool Wks., Cleveland, O.
Anville, E. J. Mfg. Co., Waterbury, Ct.
Morgan Construction Co., Worcester, Mass.
Waterbury Mch. Co., Waterbury, Conn.
- Wire Straightening and Cutting Machinery.**
Adt, John & Son, New Haven, Conn.
- Wire Nails.**
Consolidated Steel & Wire Co., St. Louis, Mo.
Indiana Wire Fence Co., Crawfordsville, Ind.
Kilmer Mfg. Co., Newburg, N. Y.
New Castle Wire Nail Co., New Castle, Pa.
Phillips, E. & Sons, South Hanover, Mass.
Phillips, Townsend & Co., Phila., Pa.
Salem Wire Nail Co., Salem, O.
Whitney, A. H. & Co., New York City.
- Wire Rods, Steel.**
Consolidated Steel & Wire Co., St. Louis, Mo.
New Castle Wire Nail Co., New Castle, Pa.
Washburn & Moen Mfg. Co., Worcester, Mass.
Whitney, A. R. & Co., 17 B'way, N. Y.
Wolff, R. H. & Co., Ltd., 118th Street and Harlem River, N. Y.
- Wire Rope, Iron and Steel Makers.**
Broderick & Bascom Rope Co., St. Louis, Mo.
California Wire Ropes, San Francisco.
Hasard Mfg. Co., Wilkesbarre, Pa.
A. Leschen & Sons Rope Co., St. Louis.
Trenton Iron Co., Trenton, N. J.
Washburn & Moen Mfg. Co., Worcester, Mass.
Williamsport Wire Rope Co., Williamsport, Pa.
- Wire Spool.**
Malin & Co., Cleveland, O.
- Wood-Working Machinery.**
Fay, J. A. & Egan Co., Cincinnati, O.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
- Wrapping Paper.**
Amer. Roll Paper Co., St. Louis, Mo.
- Wrenches, Manufacturers of.**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings, Spencer & Co., Hartford, Conn.
Capitol Mfg. Co., Chicago, Ill.
Coes Wrench Co., Worcester, Mass.
Gendron Iron Wheel Co., Toledo, O.
Keystone Mfg. Co., Buffalo, N. Y.
Tower & Lyon, 95 Chambers St., N. Y.
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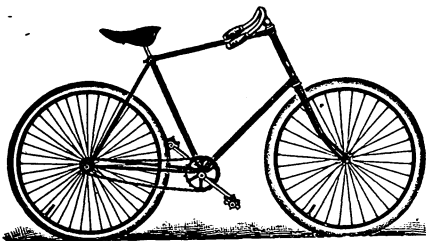
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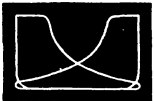
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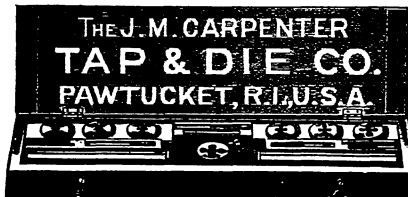


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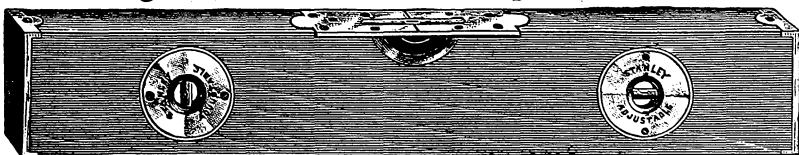
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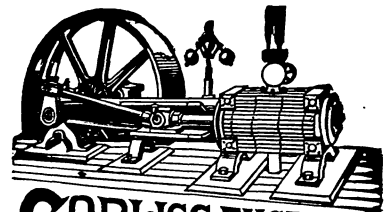


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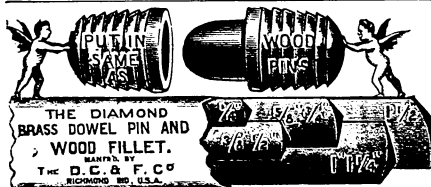
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THE IRON AGE

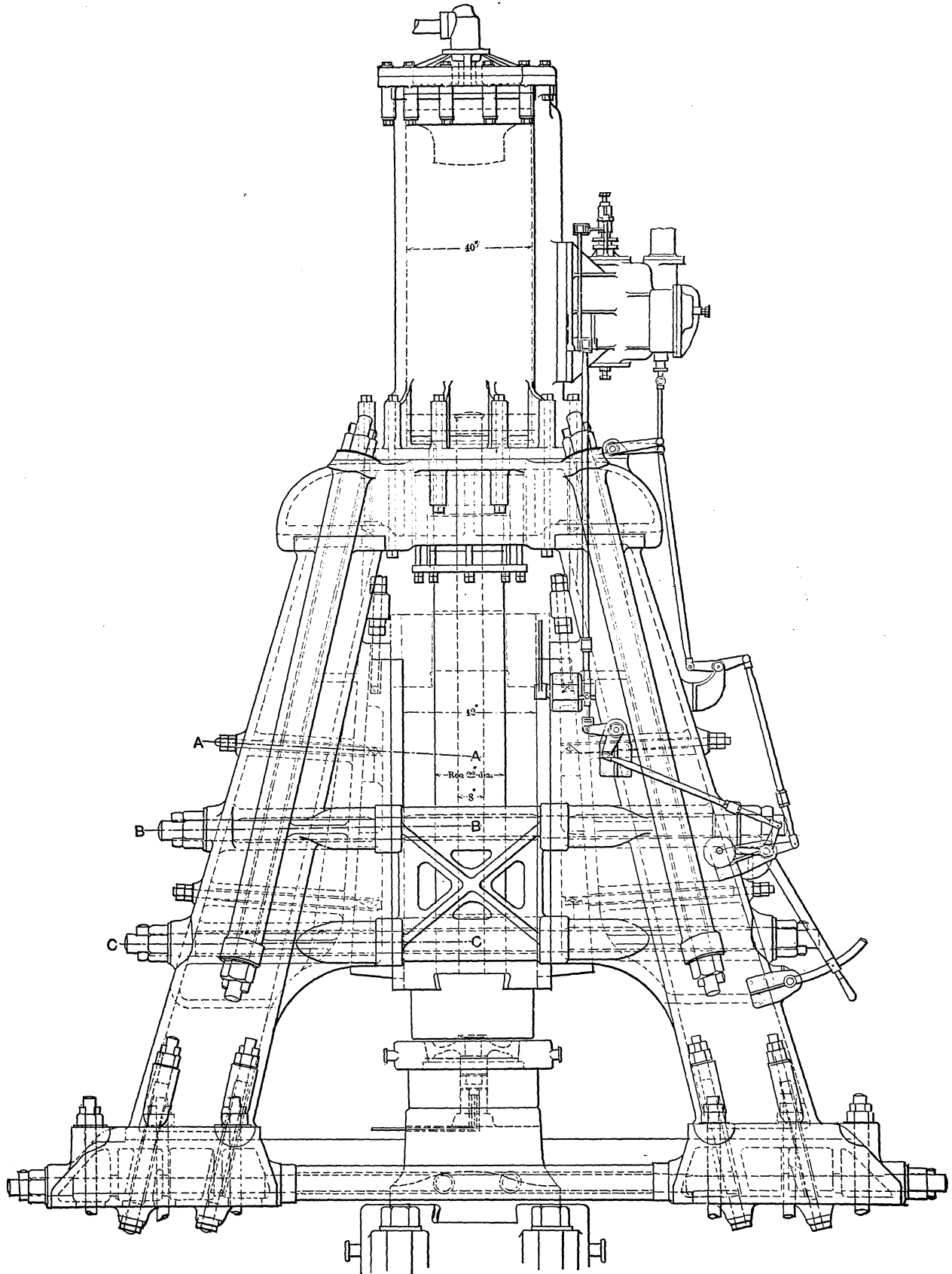
THURSDAY, DECEMBER 7, 1893.

The Pearson Car Wheel Forging Machine.

The accompanying engravings show a new car wheel forging machine invented and recently patented by W. A.

Pearson, formerly of Scranton, Pa., and now mechanical engineer of the General Electric Company, Schenectady Works. This machinery is now in successful operation at the works of the Boies Steel Wheel Company, Scranton,

Pa. The hammer was built by the Morgan Engineering Company, Alliance, Ohio. It is double acting and has a stroke of 8 feet. The cylinder is 40 inches in diameter and weighs 15 tons. The entablature weighs 12 tons,



THE PEARSON CAR WHEEL FORGING MACHINE.

the housings 56 tons, the bed plates 30 tons. The piston head and rod are made in one forging and this was made by the Bethlehem Iron Company. It

tons. The tup is also a steel forging and weighs 3 tons. There are some 20 tons of steel bolts. This hammer is constructed on the long bolt principle,

which is steel and 200 tons cast iron. Each block fits snugly over the projection on the top side of them. Both the top and bottom sides of all are

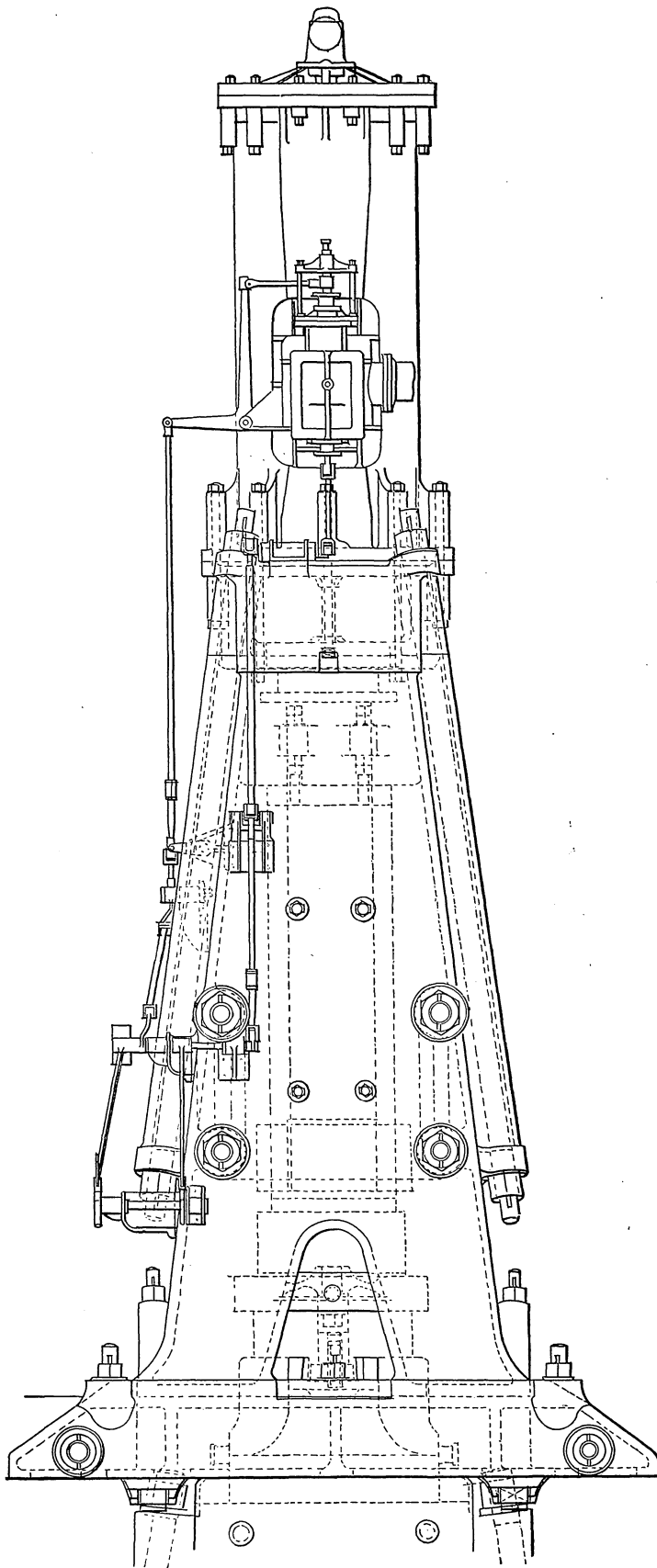


Fig. 2.—Side Elevation.

THE PEARSON CAR WHEEL FORGING MACHINE.

was made of steel similar to gun jackets, has a 6 inch hole through it, and was oil tempered and annealed. It is 22 inches in diameter and weighs 12

all set up to a tension of 20,000 pounds per square inch. The hammer weighs, in round numbers, 150 tons. The anvil block weighs 250 tons, 50 tons of

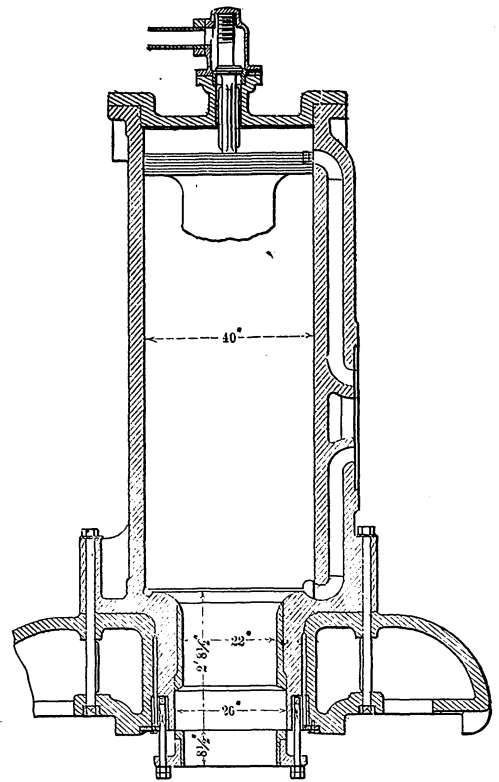


Fig. 3.—Vertical Section of Cylinder.

planed accurate and then bolted together with four 6-inch steel bolts. The whole mass rests on three layers of oak timber, 12 x 12 inches, as shown in Fig. 5. These timbers were planed on the sides before being bolted together and then faced off on a boring mill. The bottom plate that rests on the concrete foundation was planed on the top side, making the whole thing mechanically correct. All corners of the under side of bottom plate were made round, so that it would not allow the foundation to crack from the corners. The size of the bottom plate is 11 x 13 feet and the base of foundation 26 x 32 feet.

Fig. 1 is a front elevation of the machine. Fig. 2 is a side elevation of the same. Fig. 3 is a vertical section of cylinder. Fig. 4, horizontal sections of Fig. 1. Fig. 5, vertical sections of foundation. Fig. 6, vertical section of dies and wheel blank. Fig. 7, vertical section of dies, punch and wheel. Fig. 8, vertical section of hydraulic lift for removing the portion punched from the hub of the wheel.

This machine is adapted for forging articles which require considerable force and great accuracy. It has been common in steam hammers, steam forges, &c., to use a light piston rod and concentrate the necessary weight in the tup or the end of the piston rod which carries the die, or in the hammer head, the tup or hammer head being guided throughout the stroke. It has been found in practice that such an arrangement is both costly and inconvenient, for the reason that every stroke of the hammer or die imparts a shock and a quivering motion to the piston rod, causing it to crystallize and finally to break, thus entailing heavy expense for renewal, besides considerable delay to the works.

Another old construction is that in which the necessary weight for strik-

ing the blow is in the piston rod, which is made of large diameter, and the hammer head or tup and the piston are made comparatively light. In this variety of quiring great accuracy in the application of the die it has been found that such a piston cannot be depended upon unaided by guides. This hammer has

its entire stroke, so that the blow of the die is delivered with the utmost accuracy, while at the same time the piston rod is practically indestructible, and the blow is more effective because the weight is concentrated directly above the blank in the piston instead of overhanging the blank, as is the case where the weight is in the tup.

A novel feature of the upper die is a central test or projection upon the face of the die, which forms a corresponding depression in the hub of the blank, adapted to center and hold the punch, which is afterward used to form the hole through the hub. The wheel center is formed within an annular matrix, the inner face of which is tapered and conforms exactly to the peripheral surface of the finished wheel center. This matrix rests upon the shoulders of the lower die. The lower die has a vertical well directly beneath the hub of the blank and about equal in diameter to the hub, as indicated in Figs. 6 and 7. Within the well and suitably supported is a solid disk, upon which the hub of the wheel center is formed and which really forms a part of the lower die when in place. The disk rests upon a second cup shaped disk, which in turn rests upon a cylindrical support having a broader base, which rests upon the anvil block. The solid and cup shaped disks fit closely within the well, but are removable therefrom. The other parts in the well are not designed to be removable except for repairs. The upper end of the cup shaped disk has a peripheral flange and the lower end of the punch die and solid disk are reduced so as to fit within the flange and accurately center the die and disk. Beneath the cup shaped disk and within the cylindrical support is a hydraulic lift, shown enlarged in Fig. 8, of peculiar construction. The piston of the lift is stationary and supported by a hollow piston rod which rests upon the anvil block. The opening in the piston rod extends nearly to the lower end of the rod and at its lower end it is connected with a pipe which conveys water under pressure to operate the lift. The piston follower is screwed into the threaded recess in the upper surface of the piston and a packing ring of asbestos is confined between the flange and piston proper. Fitting loosely within the cylindrical support and surrounding the piston is a cylinder closed at the upper end. Upon the lower end of the cylinder is a nut screwed on or otherwise attached thereto, having an inwardly projecting flange or shoulder adapted to engage the under side of the piston when the cylinder is forced upward, and this limits its motion and prevents it from being forced off of the piston. The cylinder at the lower end of the travel rests upon the follower.

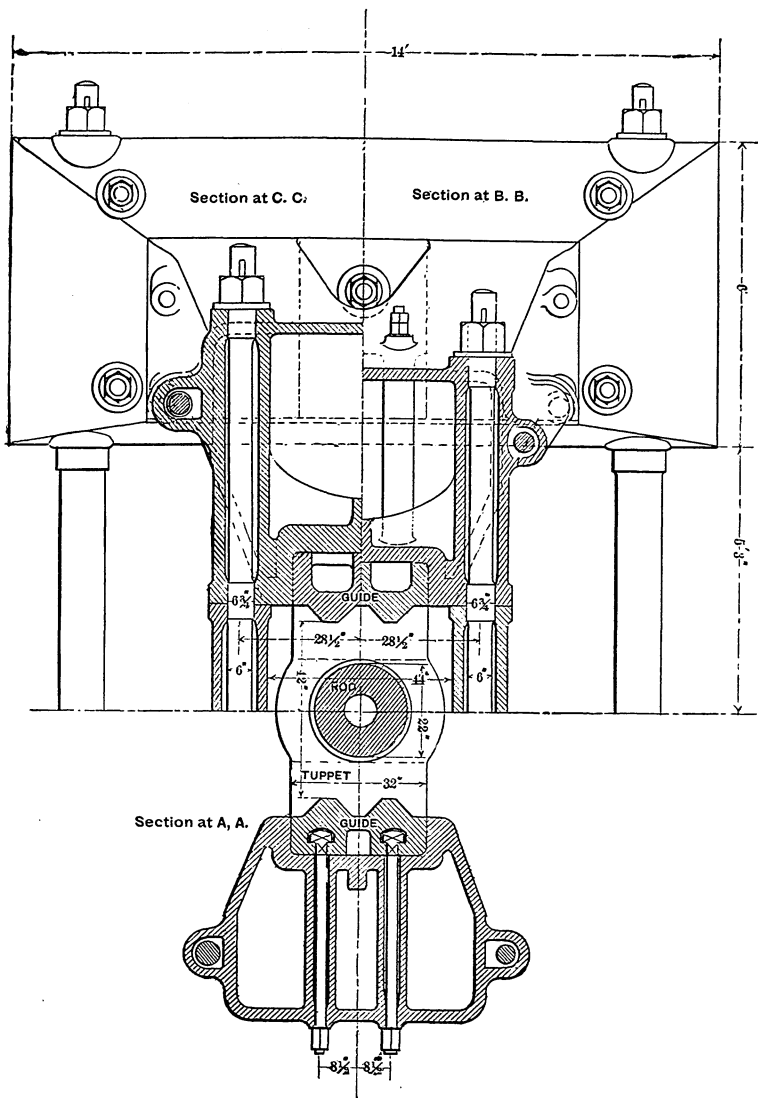


Fig. 4.—Horizontal Sections, Fig. 1, as Indicated.

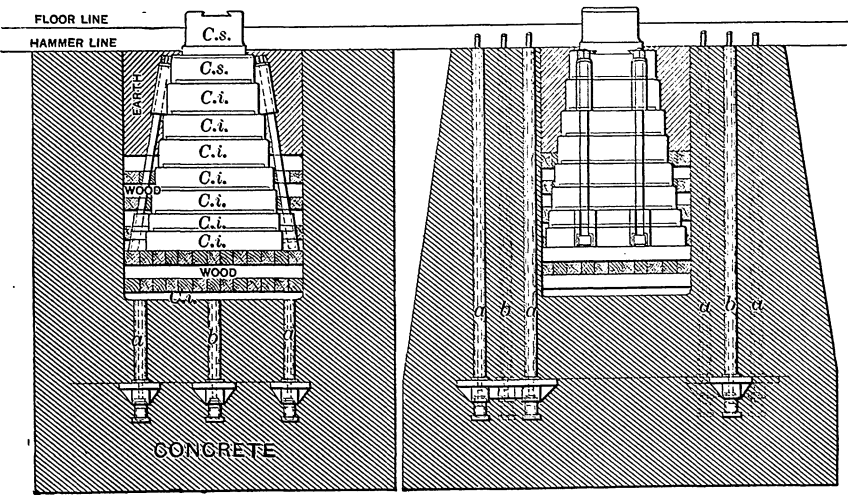


Fig. 5.—Vertical Sections of Foundations.

THE PEARSON CAR WHEEL FORGING MACHINE.

hammer the piston rod is relied upon to guide the hammer or die to the proper point. For the purpose of making correct wheel centers and other forms re-

a comparatively light piston and tup or die holder with a strong and heavy piston rod, and guides are provided for the tup or die, which guide it during

The Howe Scale Company of Rutland, Vt., have purchased the entire stock of the Harrison Conveyor Company of Chicago, who for the past seven or eight years have been doing business throughout the West to a large extent and to a more limited degree in the East. The manufacture of the Harrison conveyor will now be prosecuted at the works at Rutland. The company have already completed three large contracts and have several others in view. The Harrison conveyor is a device for the transferring of coal, grain, ice, &c. In connection with the transferring of grain it is stated that it can handle different kinds of grain without cleaning out the trough or mixing the grain; and the grain can be

conveyed in opposite directions at the same time, all with the same conveyor. It is especially adapted to use in connection with breweries, in transferring barley, and has been used for the icing of trains or refrigerator cars and for the loading of gravel trains from gravel pits. It is also adapted for use in tanneries, paper mills, sewer pipe manufacturing and in foundries.

Mechanical Engineering the Basis for the Electrical Engineer.

In a recent issue of the *Stevens Indicator* we find an article by C. J. Field on the electrical engineer and his relation to mechanical engineering. The question confronts the young student who desires to take up the study of electrical engineering as to which course

engineering in which questions are not continually arising in a day's work which can only be answered by a knowledge of mechanical engineering; that is, in the designing of all the apparatus which is now being manufactured in the different branches and departments of this profession, in their working, and in the building and equipment of the works, plants, roads and machinery in which this apparatus is entering so largely and playing such an important part. The young engineer who is not prepared and ready to take it up in this sense will find his field of progress and development restricted to a much narrower channel, and to be much slower in every respect; and he will be compelled, as we have seen many of them do, to qualify himself more fully as a mechanical engineer in order to keep up with others who have started along with him.

We may take as another example the building of an electric railway plant. Let us look for a moment into the different qualifications which an electrical engineer must have, and the difficulties he has to encounter, to properly qualify himself and meet the requirements and expectations which are placed on him in many works of this kind. They cover not only a full knowledge and experience with all classes of generators and motors, but also of cars, their framing, equipment, trucks, wheels, rails, steam plant of the best and most efficient type to meet the varied requirements and conditions found in different cases, capacity to design power stations and car houses complete in every respect, with a knowledge of foundations required for the machinery and its operation, the building of road bed complete, and the paving of the streets in connection with the same, installation

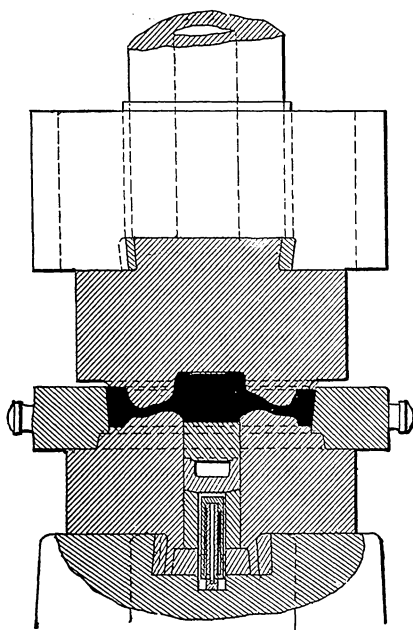


Fig. 6.—Vertical Section of Dies and Wheel Blank.

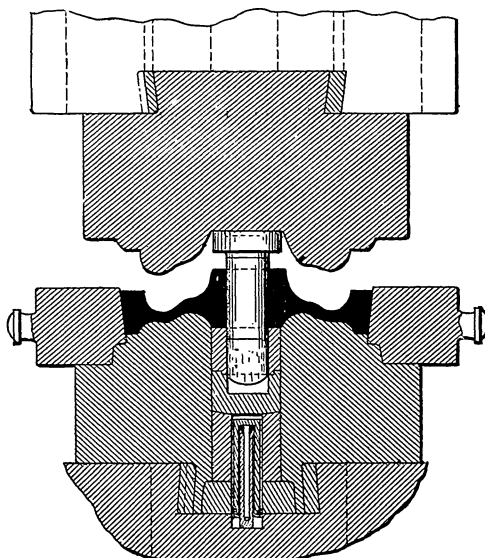


Fig. 7.—Vertical Section of Dies, Punch and Wheel.

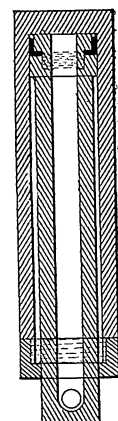


Fig. 8.—Vertical Section of Hydraulic Lift.

THE PEARSON CAR WHEEL FORGING MACHINE.

is best suited for his requirements. Stevens Institute has tried to answer this by taking the stand that her course of mechanical engineering qualified and equipped the student to enter the ranks of electrical engineers, this stand being taken on the assumption that three-fourths of electrical engineering is mechanical engineering. From his own experience, Mr. Field indorses these views in every respect. This is explained in the following way:

Electrical science to-day is in a more active stage of development and progress than the older and more established branches of engineering—civil, mining, marine and mechanical. The electrical engineer, therefore requires, in order to fully enter the lists with his co-workers in this line and make that progress which all young engineers are desirous of doing, to be qualified to take part in the designing and construction of apparatus and works which are going on now the world over in connection with his profession. This we consider to be the real basis for what has proved to be the requirements in this line. There is hardly any department of the profession of electrical en-

We will take, for instance, a few examples which come more prominently before us of what the electrical engineer may be called upon to do in this line on some of the few things which he is liable to encounter. For instance, in the designing and building of electric power generators and motors, experience has shown, in every apparatus of this kind which has been built by the different companies, that the calculation and determination of the electrical quantities and parts of the apparatus have, in the few short years in which they have been in a stage of development, become so perfected that they show to-day in this part a higher efficiency than any other generator or transformer of power.

It is, however, in the designing of the apparatus that the greatest difficulty has been experienced, to secure their proper working from a mechanical standpoint, and we have had in this line a number of examples of the brilliant electrical design of apparatus, which has failed utterly in its working caused by a lack of proper knowledge and experience in the designing of its mechanical parts.

of underground conduits and feeder wires in connection therewith, and erection of overhead structures.

Transferring orders from the recently burned sheet mills of Wheeling to the mills at near by points in Ohio has made business lively in that line. The demand for galvanized sheets continues to hold good, the orders received being from all parts of the United States. This is regarded as a sure indication that building is going on at a lively rate. The use of this material for cornices and furnishings of buildings shows a steady increase.

California's Midwinter Fair, to be opened at San Francisco on January 1, gives promise of being a highly successful venture. Twenty-five nations have appointed commissioners and will be represented by important exhibits, and many of the most striking objects from the Chicago World's Fair are being transferred to Golden Gate Park. So many applications for space have been received that the directors are hard put to it to find accommodation for all who desire to exhibit there.

Notes on the Machinery of the New Vessels of the U. S. N. *

BY GEO. W. MELVILLE, ENGINEER-IN-CHIEF, U. S. N.

The earliest of our ships were gunboats and protected cruisers, and in order to get the machinery below the protective deck the engines were of the horizontal type. When vertical armor around the cylinders was introduced vertical engines were used.

One of the most important considerations for high power ships is the matter of economy at ordinary cruising speeds. In the old days, where the maximum speed was perhaps 12 knots, it was a very easy matter to run at 8 knots with at least the same and probably greater economy than at full power, but in our modern ships, built to make 18 and 20 knots, it is a very different thing to reduce the speed to 10 knots. The friction alone of moving the immense pistons and other moving parts of the 16,000 horse-power engine when it is developing perhaps only 1500 deducts a very large amount from the gross horse power and leaves the net a very small fraction. Besides the matter of friction, there is to be taken account of the immense cylinder condensation in these large engines running at greatly reduced power and with high grades of expansion. This would reduce the economy very decidedly.

One of the earliest attempts to solve this problem was to have two sets of engines on the same shaft, one of which could be thrown out at reduced powers.

Another method, which naturally suggested itself when the number of cylinders was multiplied in the adoption of the triple expansion engine, was the cutting out of the low pressure cylinder at reduced powers and running as a compound engine with the two smaller cylinders of the original triple expansion engines. This would then work up to somewhere near the full power of the cylinders of that size with a reduced pressure, so that, while not nearly as economical as well designed triple expansion engines for the power which was actually being used, it would, nevertheless, be more economical than the large triple expansion engines working at very much reduced power. This method we have adopted on our armored cruiser, the "Maine."

The next method was in subdividing the very large power among three engines instead of two, giving us the triple screw ship, so that at very low speeds only the central engine need be used, the propellers of the side engines being disconnected and allowed to revolve freely. In this case we have a single engine working up to pretty nearly its full power, when the steam economy would be good, while in the case of the two large engines working at very reduced powers the steam economy reduced by condensation would be very low. The first of our triple screw cruisers, the "Columbia," has just had her official trials, which have been a great success as far as working at maximum power is concerned.

Another method of combining an engine which shall be fairly economical at full power with one having good economy at moderate powers is the engine assigned for the gunboat No. 7. In this case more than two-thirds the boiler power is in the shape of tubulous

boilers, whose weight is only about one-half that of the ordinary cylindrical boiler. The special novelty in the design consists in having the engine designed as a quadruple expansion engine for full power, taking steam to the high pressure cylinders from the coil boilers, while the remainder of the boiler power, which consists of two cylindrical boilers, will furnish steam to the first receiver, a reducing valve being fitted so that the pressure in the receiver will be just equal to the pressure of the steam discharged from the high pressure cylinder. Of course, while this is entirely novel, it is really an extension of the idea which has obtained for some time of exhausting from the auxiliaries into the receivers. This provides for full power. At reduced powers the engines will be made triple expansion by disconnecting the large low pressure cylinders, leaving the triple expansion engines composed of the three smaller ones, and the cylinders have been designed so that they have good proportions for economical working as a triple expansion engine with steam at 160 pounds. The cylindrical boilers are designed to furnish steam at this pressure, while the coil boilers will furnish to the high pressure cylinders of the quadruple expansion engine steam at 250 pounds pressure.

Auxiliaries.

Doubtless we have all thought of the fact that the multiplication of auxiliaries, independently of the main engine on board ship, has involved considerable steam consumption which was not applied directly to propulsion, but, so far as I am aware, the matter had never been considered in great detail until Professor Hollis, then a passed assistant engineer in the navy, discussed it about a year ago in some lectures he delivered at the Naval War College. I have inserted a table which he gives, based on the performance of machinery with which he had had personal experience, showing the percentage of steam developed by the boilers applied to propulsion and to auxiliaries at various speeds, and you will notice at a glance that at low powers the proportion expended in auxiliaries is very large.

Taking one case from this table, we find that the "Charleston" when steaming 4 knots required 107 horse-power and her air pumps 23.7 horse-power. At 18 knots her main engines developed 6120 horse-power, while air pumps only required 43.7 horse-power. The paper referred to the air pumps designed by Passed Assistant Engineer Frank H. Bailey, U. S. N., which we illustrated and described in our last issue.

Forced Draft.

The boilers have always been the heaviest part of the machinery, and here naturally the greatest efforts have been made to reduce weight. The one with which we have all become so familiar in the last 10 or 15 years has been forced draft.

I am a firm believer in the benefits of forced draft when intelligently applied, and have no patience with the people who blow hot and blow cold on the subject (as I have unfortunately been compelled to experience during the last ten years), who, because an accident occasionally happens with forced draft, immediately say that it is an invention of the evil one and that it ought to be abolished altogether. The same line of argument would probably prevent our using any modern methods in any line of work.

As between the two methods of forced draft in most common use, that by

closed fire rooms and by closed ash pits, I am decidedly in favor of the latter when it can be applied. I make this proviso for the reason that some may at once ask why, if I am a believer in ash pit forced draft, nearly all of our large vessels recently designed have forced draft on the closed fire room system. It is simply because in a war vessel with a protective deck and minute water tight subdivision it is extremely difficult where there are a number of large boilers to so arrange the blowers for closed ash pit forced draft as to ventilate the fire room thoroughly. This is a point which is sometimes forgotten, but if it is the fire room would simply become intolerably hot, and while the boilers themselves will work admirably the men will simply be killed by the heat. The "San Francisco" of our navy has ash pit forced draft, and all who have had experience on her and on other vessels speak in the highest terms of praise of the greater facility, convenience and comfort which attends this method.

With this method of forced draft leaky tubes in the combustion chamber are unknown, while with the closed fire room forced draft they are not at all uncommon.

There is another method of forced draft which is very old, but which has only been used on board ship within the last year or two—that of high smoke pipes. Tall chimneys are the most common method on shore for getting a strong draft, but prejudice or conservatism has until recently prevented the application of this practice to use on board ship. When we were designing the "Brooklyn" and "Iowa" I asked to have the smoke pipes made 100 feet high, in which I was heartily seconded by the Chief Constructor of the Navy; but a gentleman in the Navy Department who was entirely ignorant of technical affairs so represented the matter to the Secretary that the latter asked me to submit the reasons why I desired to use these high smoke pipes. These reasons Mr. Melville embodied in an appendix to his paper. They may be summarized as follows: The high pipe increases the speed without injury to anything. Increases the life of the boiler. Increases the economy of combustion at moderate powers. Saves coal lost by radiation from extra boilers used with short pipes. Saves in repairs to boilers. Saves in repairs to blowers. Saves extra coal needed to run blowers.

Induced Draft.

Another method of forced draft now coming into vogue is that known as induced draft, where, instead of closing in the fire room or the ash pit and forcing air in, the products of combustion are exhausted from the chimney by large fans. Of course this is only another way of getting the same effect that we get by the use of the steam jet and with which we have all been familiar for many years, the advantages in this case being that there is no loss of fresh water, which is a precious commodity on board ship. At a hasty glance one would not be prepared to expect very much from this method, but the experiments which have been making for some years past in England by John Brown & Co. seem to show that this method is very promising, and I understand it is to be fitted to some or all of the large vessels which are now building for the International Navigation Company.

Boilers.

The discussion thus far of reduction of weight assumes that the boilers them-

* Abstract of paper presented at the first session of the Society of Naval Architects and Marine Engineers.

selves are not changed materially otherwise than for the fitting of the forced draft appliances, but the question has been a very vital one for some time past and is now of extreme importance whether we shall not entirely abandon the present types of boilers and adopt a very much lighter one by using what are called coil or tubulous boilers. This matter has been discussed so much by so many able minds that it is unnecessary for me to go into the matter at length here. We all know the great advantages of these boilers in the way of immense reduction of weight, safety against disastrous explosions, rapidity with which steam can be raised, absolute safety against injury from any amount of forcing, and the ease with which, if necessary, a boiler can be removed and replaced. Almost the only objection appears to be the fear that they will not be durable because of the fact that they are composed almost entirely of very thin tubes, and our experience with these tubes in ordinary boilers has not been such as to lead us to expect a very long life from the coil boilers. However, some coil boilers have been in use for five or six years without showing appreciable deterioration, and a few have been used with fresh water entirely for more than ten years.

The Decrease in Weight of the Engines

themselves has been due to three causes: An increase of steam pressure, an increase of piston speed, and the use of stronger materials. Piston speeds have more than doubled in the last 15 years, and our larger vessels are now running with piston speeds of about 950 feet per minute, while some of the smaller ones, like the torpedo boats, are designed for a piston speed of over 1000 feet. If materials should go on improving so that we can reduce the weight of our reciprocating parts, I see no reason why piston speeds should not be increased still more, which, of course, would result in still further reducing weights. If we adopt the coil boiler generally we shall also carry very much higher steam pressures, because we already are carrying pressures of 250 pounds in some of our torpedo boats with great success. We have greatly reduced the weight of most of the engines by the use of forged steel for piston and connecting rods, valve stems and shafting, and cast steel for pistons, valves, bed plates and frames, but there does not at present seem to be much prospect of displacing cast iron as the metal for cylinders. If this should come about, we could still further reduce our weights, and if nickel steel should within the next ten years become as commonly used as mild steel is now we would have a big reduction in weight all around.

Trials of Vessels.

The early vessels for our navy were contracted for with the understanding that they were to develop a certain horse power. The contractors felt that with an agreed steam pressure to start with, and known sizes of cylinders, they could confidently guarantee that they would develop a certain horse-power; but we had at that time no reliable data on which to base our speeds, all our information being of foreign ships, and while I do not for a moment pretend to say that their trials are not conducted with every effort to secure fairness, we, of course, did not know all the circumstances, as we have since about our own ships, and so might be pardoned for feeling a little uncertain.

In connection with the contract it was provided that for each horse-power in excess of the guarantee there should be a certain premium, usually \$100, and for every horse-power below the contract requirement there should be a fine of the same amount. This made it very important that the horse-power should be determined accurately.

All the indicators used are tested at the New York Navy Yard, where there is the most elaborate and accurate testing apparatus in the world.

It may possibly not seem strictly germane to the title of this article to bring in the matter of speed trials, but I do so merely to call attention to a method which I had the honor to bring to the attention of the Navy Department, and which was unanimously approved by the Board of Construction of that department, and was used with great success in the trial of the "Bancroft" early in this year. It consisted in a series of progressive trials for the purpose of standardizing the screw and determining accurately the number of revolutions corresponding to a particular speed. Then having laid a curve to show the relation of speed to revolutions, the vessel could be taken to sea anywhere and the continuous endurance trial run off and the speed at once determined as soon as the average revolutions for the entire period were known. Doubtless many of you are aware that the fast Argentine cruiser, the "Ninth of July," was tested in this way, and I believe several other foreign vessels also have been. This method enabled the speed to be accurately determined with less difficulty than any other which had been suggested.

Gas Engines in Germany.

The last report of Frank H. Mason, Consul-General at Frankfort, Germany, contains the following:

Prominent among the economies which have been introduced during recent years in Germany is the use of gas motors in place of steam engines in all the smaller forms of manufacture where the motive force required does not exceed 75 to 100 horse-power. At the Frankfort electrical exposition of 1891 most of the dynamos were driven by gas and calorific engines, and the display of these motors at that time was almost as varied and interesting to the general public as that of the electrical apparatus to which they were technically subsidiary.

The statement is made that there were in operation in Germany at the time referred to, about 18,000 gas motors, aggregating a motive force of about 60,000 horse-power, since which time, by the gradual cheapening of gas as a result of careful saving of tar, ammonia, and other subsidiary products of coal distillation, the number has increased to about 25,000. The improvement in economy in these motors has been remarkable. The Lenoir machine, the best known as late as 1861, used 1235 cubic feet of gas per horse-power per hour, while at the present time small motors only consume 28 feet, and large motors as little as 23.75 feet. As the cost of gas ranges from 95 cents to \$1.36 per 1000 feet, and 21.2 feet of gas will run a 16 candle incandescent lamp an hour, which figure is reduced to 17.6 feet in large plants, it readily appears that this motive power is very economical for the smaller forms of manufacture, and especially for electric lighting by isolated plants.

Duluth News.

Iron ore shipments from Lake Superior were over at the close of last week at all the ore ports except Duluth, and there they have since ceased. For the season the record is about as follows:

	Tons.
Escanaba.....	2,000,000
Marquette and vicinity.....	1,200,000
Ashland.....	1,117,000
Two Harbors.....	894,000
Duluth.....	545,000
Total.....	5,756,000

These figures are estimates for Escanaba and Gladstone, Marquette and L'Anse. The total production for 1892 was 9,047,000 tons, nor has it been so low as now since 1888.

Early last June *The Iron Age* estimated the Mesaba range shipments for the year at 700,000 tons, which was a middle ground between the figures of those who expected to see the leases that had been made all carried out, with a good deal of ore from the mines, meaning an output of over 1,500,000 tons, and the ultra pessimists in Cleveland who talked 300,000 or 400,000 tons. As a matter of fact the range has shipped 630,000 tons; all but 20,000 tons by lake.

Late developments indicate that the new range will be able to mine, if its railroads can handle, a third of the Lake Superior output in 1894. There is mining equipment in the Lake Superior region for the production of 12,000,000 tons, could any such quantity be used in the market, and of the 7,000,000 to 9,000,000 that will likely be mined, if the year is any way favorable, the new range can easily mine 2,500,000 to 3,000,000 tons. There is, of course, a very serious question as to whether any such quantity could be handled by the two roads now reaching this range, but as both talk of large increase in track facilities they may do it. Still any speculation at this time is mere idle gossip.

The Mesaba, as a range, has not only beaten the world's record for a first year, but it has three mines which have never been equaled as first season producers. These are the Biwabik, which produced 153,500 tons, the Missabe Mountain, 130,000 tons, and the Commodore, 67,000 tons. The Mountain Iron, with a production of 125,000 tons, was the only mine on the range in 1892, sending out 4240 tons that season.

The Minnesota Iron Company, at Tower, has put a large force of men at work and is stock piling at the rate of 50,000 tons monthly for next season. The Chandler put 200 men on this week and is expected to mine nearly 500,000 tons in the year. On this range, the Vermilion, little else will be done.

At the Biwabik mine stripping contracts aggregating 600,000 yards of earth have been let and are begun; the largest of them requires the removal of 300,000 yards, 80,000 of it this winter. Six locomotives, four steam shovels and 300 men are stripping at the Mountain Iron.

The Marquette, Menominee and Gogebic ranges are gradually resuming work, the latest mines to start being the Norrie and Carey, on the Gogebic. These ranges are looked on for a possible production of 1,200,000 tons, 1,000,000 tons and 1,700,000 tons for 1894.

An important deal on the Mesaba has just been closed in the lease to the Thomas Iron Company of the Pennsylvania anthracite regions of the Hale mine, out of which it is to take some 250,000 tons in the next two years. The Hale is a high grade non-Bessemer mine and is stripped for surface mining.

Work in Hot Pressed Steel.

In *The Iron Age* of May 26, 1892, we described and illustrated very fully the method of making solid drawn steel projectiles for the Government as practiced by the United States Projectile Company, Fifty-third street and First avenue, Brooklyn, N. Y. We now have the privilege, through the courtesy of Arthur T. Porter, manager of the company, of describing work of an unusual character which is now being performed at the same establishment in the shape of hot pressed steel work. The steel bottle shown in Fig. 1 and work of similar character, such as heavy U-shaped cups, heads and disks, are made from plate steel up to 1 inch or more in thickness, and are handled with surprising facility. The heads for the Whitehead torpedoes, of which a large quantity have been furnished for the Government, were made by this company. Intricate shapes used for centrifugal machines are also made from this material by hydraulic pressure.

The pressure vessels shown in Fig. 2 are made by a process very similar to that used in the manufacture of projectiles, the solid billet being first heated, and then by successive passes

working pressure of air of 100 atmospheres. Tests of these vessels have shown that the metal has been increased in strength to a marked degree; that it is free from imperfections of any kind, and that it will stand an enormous pressure before showing even a slight degree of expansion. For instance, a vessel 40 inches long, $6\frac{1}{2}$ inches in diameter and having a thickness of side wall of $\frac{3}{8}$ inch has been tested up to 5000 pounds per square inch, and would

pressure of over 1,000,000 pounds. The above size is one that is largely used in street railway service. These sizes can, of course, be modified when other types of gears are required; the only limit is the power of the machine to make the article. In actual service on electric motors in street railway service these pinions have shown a life far exceeding that of the best cut steel pinions. It is very evident that the process of manufacture compresses the metal, imparts to



Fig. 1.—Steel Bottle.

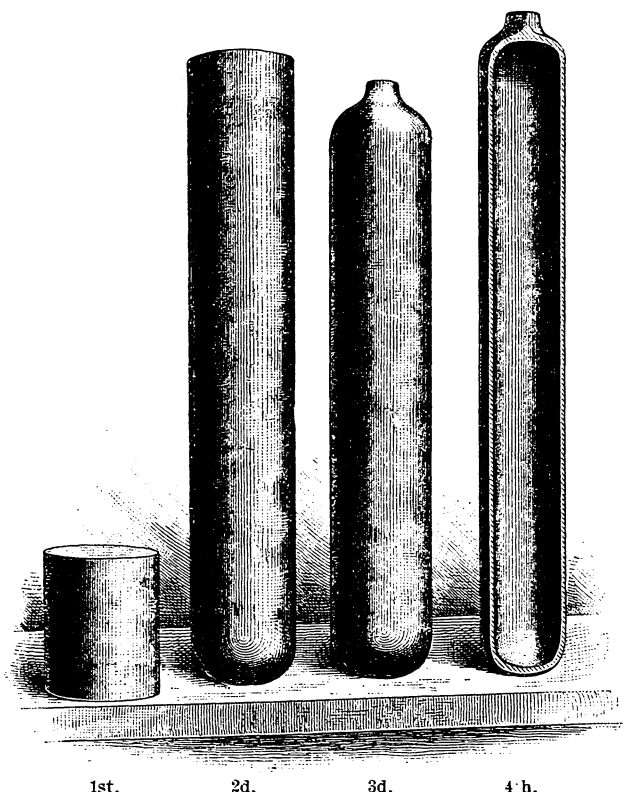


Fig. 2.—Billet and Steel Pressure Vessels.

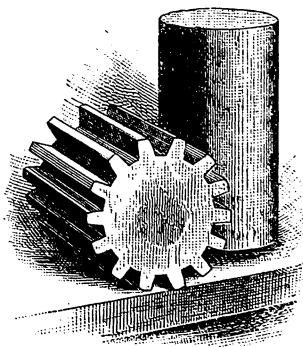


Fig. 3.—Billet and Hot Pressed Steel Pinion.

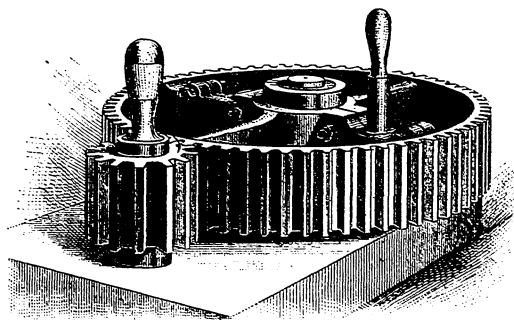


Fig. 4.—Device for Testing Accuracy of Hot Pressed Steel Pinion.

WORK IN HOT PRESSED STEEL.

through powerful machines being brought to the form shown. They are made in one piece without any seam or weld. Fig. 2 shows: 1, The billet; 2, the vessel before closing the end; 3, the vessel after closing the end; and, 4, section of the vessel cut in half. These vessels are used for holding gases, air, &c., under pressure, their small compass and great strength making them superior to every other method of manufacture. A large quantity of these have been furnished to the Navy Department to be used as air accumulators for charging the Whitehead torpedoes on the naval vessels, and stand a

probably stand double this amount without undue straining of the material.

As a knowledge gained in the handling of steel in making cylindrical articles, the idea was still further extended in the formation of hot pressed pinions, as shown in Figs. 3 and 4, for which letters patent have been granted. The billet shown in Fig. 3 is at one operation pressed into the form of the pinion shown alongside of it. The billet is $7\frac{1}{2}$ inches in length and $3\frac{7}{8}$ inches in diameter. The pinion is $4\frac{1}{2}$ inches pitch diameter, $4\frac{1}{2}$ inches in length, and has 13 teeth. The machine used for this work is a press having a

it an exceedingly fine and tough texture, and as the pinion leaves the mold in so perfect a condition as to require no machining whatever beyond the facing of each end, boring the hole and key seating, the surface left on the teeth is extremely hard and well adapted to withstand the severe usage it receives in electric motor service. These pinions have been tested on the Brooklyn electric roads for several months, and they have made a record for durability beyond any ever attained by other processes.

The device shown in Fig. 4 is intended for testing the accuracy of the

pinions after they have been finished. It consists of a spindle mounted on a base and adapted to carry the pinion. A large cut steel gear is so mounted as to engage with this pinion, and provided with a handle by means of which it can be rotated. Pinions direct from the press, and the teeth of which have received no attention whatever, are placed upon this machine and tested. It has been found that they mesh perfectly with the large gear, and if in a few instances they do not mesh, it is but the work of a few minutes to remove any slight swell that might be caused by the wear of the die.

The field for this class of work is widening year by year, as it is impossible to do under the drop hammer what can be done by hydraulic pressure. The decrease in the wear and tear of dies and tools and the ease with which steel can be handled give great promise for the future.

Steel Plate Rolling in Great Britain.

At a recent meeting of the British Iron and Steel Institute a paper was read on "Suggested Improvements in the Manufacture of Steel Plates." The author does not state what kind of steel is to be used in his proposed process, but as the scene of his experiments was Scotland it may be assumed that whenever ingots or blooms are mentioned the quality is soft open hearth.

From an American point of view, the paper presents many amusing features, the principal one being the earnestness and gravity with which a process of rolling steel plates is discussed, which has been a success, to the writer's knowledge, since 1881 in the United States, was tried in Scotland in 1884 and abandoned as a failure. It is now, in the year 1893, brought up for discussion before the most celebrated body of iron and steel manufacturers.

Plainly stated, the paper discusses at considerable length, and in a manner difficult to thoroughly understand at first reading, whether or not it is possible to roll a perfect ship or boiler plate direct from a steel ingot without first rolling the ingot into slabs or blooms and reheating them. In his introduction, the writer of the paper says that he expects to be told that there is nothing new in the idea or suggestion which he offers, so far as a direct process is concerned, but he does claim novelty in his manner of doing the work. In the absence of drawings it is difficult to understand the details of the proposed process, but with all due respect to the author it may be truly stated that to Americans there is nothing new in the method, which has, under slightly different conditions, long been a success in this country. The new method discussed by the British ironmasters consists in rolling the ingot into a bloom, and after shearing to specified lengths to make plates of a required weight, complete the process of rolling without reheating. This, it is claimed, reduces the loss from waste in trimming the plates to a point below the loss incurred when the ingot is rolled direct into a large plate without being clogged and afterward sheared to specified dimensions. This method makes it necessary to use both a blooming mill and a finishing mill, and it is herein that the difference lies between the proposed British plant and the already established and successful American method. In American practice only one stand of rolls is

used. The plate mill seen in operation by the writer in 1881 contained one stand of rolls 30 inches diameter, 120 inches long. The mill was equipped with hydraulic cranes on both sides of the rolls and automatic carriers. Ingots weighing 3000 to 6000 pounds were started down the carrying table to the rolls, which were operated by a reversing engine coupled direct, and passed through the rolls forward and backward with such rapidity that plates when finished and thrown off to the leveling floor were often cherry red. In shearing the utmost care was used to consume as much as possible of the plates in rectangular shapes, and in marking, the sizes of small plates were added together in such a careful manner that very little scrap was left. If it did happen that there was a long end or side piece left over they were cut to specified sizes from 5 to 14 inches in width and used for rolling into light sheets. Upon this point the saving in scrap was greater than in the proposed British method, for the reason that in the British plan it would be necessary to trim the four sides of a number of small sized plates and lose the scrap, while in the American method the scrap from the four sides of one large plate only is lost. It is very seldom that a piece of plate is left over having a superficial area of more than 8 feet, while the complete area of a single plate is often 400 feet. This being the case, the blooming mill and vertical bloom shear suggested for the British mill are not necessary. In the United States the much discussed result is accomplished with a plant half the size, employing less than half as many men and at only half the cost. In regard to quality, the American plan has been so successful that the reputation of a brand of steel made in this manner grew to such an extent that it was not an uncommon thing, a few years ago, to mention in specifications that the quality of plate used should be that special brand or something equal to it. The ingots were carefully chipped before being rolled and plates were seldom found to have an imperfect surface. The custom of stipulating that a special brand of steel shall be used has since died out and almost any make of American plates made either in the manner described or with the intermediate process of hammering or slabbing would successfully pass the tests of Lloyd's or the Admiralty.

To further illustrate how far behind some Britishers are in their ideas regarding progressive rolling mill practice, the writer of the paper under discussion states, in effect, that it was not without some little hesitation that he departed from old lines and adopted the method of coupling engines direct, instead of using gears. There was no need for any hesitation; Americans have long ago proved that coupling a roll train direct to the engine shaft and operating at a high speed is not only perfectly safe, but much more effective in rolling blooms, billets or other heavy sections and plates than if gear wheels were used. It can be quickly demonstrated that on the point of tonnage from a given power or financial outlay Americans are far in the lead. The results are mainly due to the efforts of engineers and rolling mill builders who have taken the place of the old school of managers and they tell a wonderful story of progress, but the author of the paper under criticism warns his British brethren in the following words: "I consider it a mistake to give too unlimited scope to the purely engineering

element, with its invariably good spending capacity." It is such extreme conservatism as this that retards progress in British practice. For instance, in the paper referred to, the following words are printed: "It will be observed, on looking at the plan, that the arrangement consists of a train of cogging rolls and the usual roughing down and finishing rolls, which could be driven by one pair of engines, but by preference by two pairs of engines." This complicated mass of machinery is what is proposed to produce a result—viz., rolling ship plate direct from ingots at one heat—which has been accomplished in the United States for at least 12 years past with one stand of rolls and one engine.

In conclusion, the British writer on the subject says: "I have attempted to lay before you some views which at least, I trust, have a little freshness about them, if nothing else." It is the lack of freshness and the extreme differences between British and American practice that have caused this article to be written. American iron and steel men always extend the utmost courtesy to foreign visitors and free access is afforded to plants where these differences are forcibly illustrated whenever Britishers desire to avail themselves of such opportunities and thus avoid the possibility of publicly discussing as new ideas matters already grown old on this side of the Atlantic.

Two of the great German steel works have just made their annual reports. Phoenix of Laar, near Ruhrort, made a gross profit of 2,578,443.69 marks. After writing off 1,160,600.29 marks, there was paid out in dividends 1,296,000 marks, or 8 per cent. on one series of stock, 6 per cent. on another and 2 per cent. on old coupons. It is interesting to note that the company paid 218,250.46 marks as their contribution for the funds for accidents to workmen and providing for their old age. Besides, the concern disbursed 177,737.18 marks for state and local taxes. These figures indicate what heavy burdens German ironmasters must bear. The concern employed 4201 men and foremen, who received in wages 5,041,097.07 marks, or an annual average of 1199 97 marks, equal to \$292. The second establishment is Union of Dortmund, which made a net profit of 1,884,363.92 marks, of which 409,519.56 marks was available for dividends. These were paid to the holders of stock series A, the amount being 1 per cent., or 388,647 marks. The company paid into workmen's relief funds 342,930.90 marks, or nearly as much as they distributed in dividends. The total wages paid to 7585 men was 7,735,307.01 marks, or an annual average of 1019 82 marks, equal to \$247.82 per annum.

Fried. Krupp of Essen has issued an exceedingly handsome souvenir of the great exhibit at the World's Columbian Exposition. It consists of a series of beautifully finished engravings of the Krupp pavilion and the principal exhibits it contained.

As the result of a stormy series of meetings of the General Assembly of the Knights of Labor, held in Philadelphia, Grand Master Workman Powderly has resigned the position which he has held for so long at the head of that decaying organization. J. R. Sovereign of Iowa was elected as his successor.

Canadian Notes.

In this country, as in the United States, a national insolvency law is being agitated, and also, as in the United States, the legislative fates have been unkind. A bill has been presented for Government sanction and adoption on the eve of three successive sessions of Parliament, but has never got before the House.

The development of electric railroads in Canadian cities has been altogether subsequent to our last tariff revision, and a duty of \$6 a ton on steel rails tends to check that development. This duty is not imposed on steam road rails. Delegations have waited on the Government to ask the removal of the duty, which was intended only for horse-car lines. The matter is under consideration, but it is expected the duty will be removed.

Proceedings have been begun to wind up the business of the Polson Linders Company, Toronto and Owen Sound, who succeeded the Polson Iron Works Company in 1892. The assets of the company amount to \$150,000.

Wood, Vallance & Co., Hamilton, one of the largest wholesale hardware houses in Ontario, now occupy two spacious new buildings, very elegantly appointed.

Burrow, Stewart & Milne, Hamilton, foundrymen, have moved into their new premises.

The Thos. McDonald Mfg. Company, Montreal, manufacturers of tinware, &c., narrowly escaped the total loss of their factories and contents by fire. As it was, they suffered a loss of about \$20,000, which was covered by insurance.

The directors of the Hamilton Iron & Steel Company have elected the following officers: President, W. Foster, Jr., New York; vice-president, J. H. Tilden; treasurer and general manager, J. J. Morehouse, New York; secretary, H. N. Curtis, New York.

The style of the Doty Engine Works, Toronto, has been changed to that of The Bertram Engine Works Company. A steel conduit, 7 feet in diameter and 60 feet long, has recently been turned out from the works for the new Sault Ste. Marie Canal.

The Canada Tool Works, Dundas, have turned out for the Nova Scotia Steel Company, New Glasgow, N. S., what is said to be the largest turning lathe ever built in Canada, to be used for turning heavy steamboat shafts and forgings. It weighs 34 net tons.

T. D. Graham of the Graham Nail Works, Toronto, suddenly left his place of business some time ago and has not turned up since. He was supposed to be doing a flourishing business. His departure appears to have been premeditated, judged by the precautions he took to dispose of movable property and secure what money he could. H. S. Howland & Co., the chief creditors, took possession of the works.

The Ontario Malleable Iron Company, Oshawa, Ont., have made considerable extensions to their premises and plant.

At their annual meeting in Toronto the Canadian Brass Manufacturers' Association re-elected Robert Mitchell, Montreal, as president, James Morrison, Toronto, first vice-president, and A. W. Glassford, Montreal, secretary. The annual agreement was renewed. It was

decided to ask the Government to withdraw the present 10 per cent. duty on raw material, as that is deemed a hindrance to an export trade.

Of Ontario's manufacturers who received awards at the World's Fair may be mentioned John Bertram & Sons, Dundas, for drilling, planing and shaping machines; the Central Bridge Works, Peterborough, for power hammer; Stevens, Hamilton & Co., Galt, for attachment for drilling machine and shaping machine; the McClary Mfg. Company, London, for tinware.

The Minnesota Moline Plow Company are credited with the intention of erecting a large warehouse in Winnipeg, from which they purpose to distribute their implements through our Northwest.

Alex. Rankine is now in possession of the St. John Bolt Works, St. John, N. B. He is making some improving alterations.

New machinery, notably several of Miller's torpedo nail pickers, is being introduced into the works of S. R. Foster & Son, St. John, N. B., manufacturers of wire and steel nails, tacks, &c.

The Trottier Axe & Edge Tool Company, Three Rivers, Quebec, have rebuilt their factory, which was burned down some time ago. At the company's annual meeting the other day the following officers were elected: R. W. Williams, president; N. L. Denoncourt, vice president; A. T. Pothier, secretary and manager; N. Carignon, treasurer.

For the three months beginning August 1, the shipments of ore from Kaslo, B. C., amounts to \$133,325.

The anthracite coal mines near Calgary are now putting out about 1000 tons daily and shipping it chiefly to the East.

The increased production of pig iron in Canada has had the good effect of lowering prices from \$3 to \$4 a ton in recent years. Formerly the prices of imported pig were a matter of competition between British and American brands, in which both were on equal terms in respect to duty, but in which the American had an advantage in regard to the interior demand in the matter of freight. But the product of Nova Scotia furnaces has been forcing these outside competitors down to still lower prices. The Londonderry, the New Glasgow and the Ferrona works in Nova Scotia produce a very acceptable iron, and the last named in particular having pushed business very actively this season as far west as Montreal. Foundrymen and importers have for some time been expecting a lowering of the duty on pig iron, and in anticipation of such change have been keeping reserve imports in bond for the last six weeks. That check to importation has benefited domestic producers of pig.

The Drury Nickel Company, in Algoma, after expending about \$150,000 for the development of their nickel property, have not kept up with the demands upon them on liability account and are to be wound up.

The collection of minerals which filled the Ontario section of mines and minerals at the World's Fair is to be preserved, but divided up. Part goes to the Toronto School of Practical Science and part to the Toronto School of Technology. Selections have been made for the International Fair at Antwerp. The exhibit carried off 35 awards at Chicago.

Is Crude Oil a Cheap Fuel?

The use of crude oil as a fuel for manufacturing purposes has claimed a great deal of attention for many years past. It has been used extensively on the Continent of Europe, particularly on steamers plying the trade of the Black Sea. Experiments without number have been made both in Europe and America and the practical application of the fluid for generating heat has been demonstrated a success beyond doubt. Methods of burning and styles of burners are counted by hundreds, but there is a lack of data for the use of beginners in making their estimates of probable cost of the fuel after the plant is properly installed as compared with coal.

It has been the privilege of a correspondent of *The Iron Age* to visit and inspect many plants where crude oil is extensively used. The various methods of its application are an interesting study, but figures regarding cost vary to such an extent that it is found to be a difficult matter to ascertain the actual value of the fuel in various localities. If a plant is carefully designed and properly attended to its convenience and cleanliness soon become apparent. There is no residue to remove and the oil is inexpensively conveyed to the burner. Repairs are slight and much less labor is required than if coal were used, but there are no records available showing the quantity of oil consumed under varying conditions from one year to another. Statements can be found showing the consumption during one to six months, but what is wanted by those who would become users of oil as fuel is a record for at least one year. The reason for this is that during warm weather the oil will keep at a temperature in the storage tanks which makes it fluid enough to pass freely through the pipes without being heated, consequently the cost of conveying oil to the burners is less than during winter, when a pipe containing live steam must be placed alongside the pipe containing oil so as to keep it in a fluid state; a coil of steam pipe must also be placed in the storage tank, and, further than this, steam must be passed through the tank car before the oil can be pumped to the storage tank. There are bursting pipes and general repairs to be contended with during the winter which the plant is exempt from during hot weather, and the items of cost vary materially during the year. For these reasons none but figures of a year's consumption should be accepted to establish the relative cost of the fuel as compared with coal. For instance, if good coal for use in a heating furnace or for generating steam in a boiler is worth \$1.75 per ton at a given point, at what price is oil equal to it in economy as a fuel? This is a question which interests many readers of *The Iron Age*, and the person who can and will satisfactorily answer it will render a valuable service.

The Tennessee Coal, Iron & Railroad Company have authorized the construction of an experimental concentrating works of 125 tons daily capacity. The plan is to calcine the lean ore of the district and concentrate it by magnetic concentration.

Bolling & Lowe of 2 Laurence Pountney Hill, London, the well known iron merchants and contractors, have issued a very interesting table of foreign weights and prices based on the English ton.

The Coxe Furnace.

Eckley B. Coxe of Drifton, Pa., described in a paper read at the Chicago congress, before the American Institute of Mining Engineers, a furnace designed by him, with automatic stoker, traveling grate and variable blast, intended especially for burning small anthracite coal. We quote as follows from the paper in question:

Having determined, in a general way, what seemed to me the proper conditions for burning small anthracite economically, I started to design a furnace which would, as far as possible, fulfill the required conditions, which were:

1. To ignite the coal and burn it up without mixing it with fresh fuel; that

ferred to in the description of the process are as follows:

Fig. 1.—Diagram illustrating the process and furnace for burning the small sizes of anthracite coal.

Figs. 2 and 3—A reduction of the working drawing from which the iron work of the automatic stoker furnace for the Stirling boilers at No. 3 Colliery, Oneida, Schuylkill County, Pa., was built.

Figs. 4 and 5.—Side and transverse elevation of the Stirling boiler plant at No. 3 Colliery, Oneida, Pa., showing the manner in which the grate is placed under the boilers; also the arrangement for moving the grate and supplying air to the furnace.

The furnace consists essentially of a traveling grate moving from the right toward the left. The coal, which is

top, but the partitions are covered by plates 27, 28, 29 and 30. These plates are of such width that no matter what may be the position of the grate bars 18, there is always one resting upon this plate, so that the air cannot pass from one chamber to another except by leakage along the bar. The result of this arrangement is that if we are blowing into the large air chamber with a pressure, say, of 1 inch water gauge, the pressure in the next air chamber to the left would be about $\frac{1}{4}$ inch, the next to that $\frac{1}{2}$ inch, and the next to that $\frac{1}{4}$ inch. Of course, these figures are not strictly correct, and are used merely for the purpose of illustrating. The pressure in the air chamber to the right would be, say, $\frac{1}{4}$ inch. The result of this state of affairs is that the coal when it arrives on the grate is subjected to a

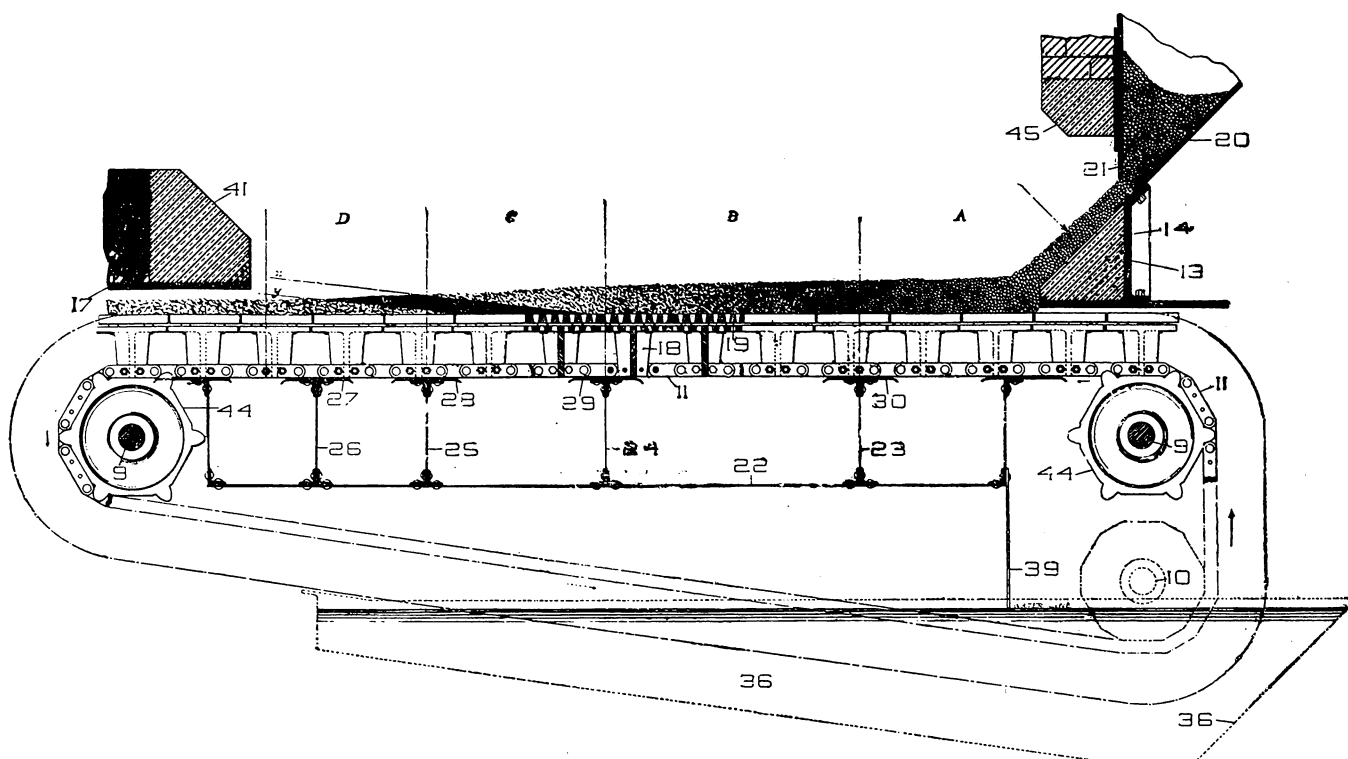


Fig. 1.—Furnace for Burning Small Size Anthracite Coal.

THE COXE FURNACE.

is, that fresh fuel would not be added to the already partially consumed coal.

2. To have the furnace so arranged that the combustion should be continuous and uniform; that is to say, that when the furnace was in use the condition of the fire would be practically the same at any hour of any day of any week of the year.

3. To make the work of firing as easy as possible, so that a minimum number of firemen would be employed, and that the whole operation of the furnace would be controlled by an intelligent man, who would have more use for his brains than for his muscles. The idea being that in a large and complete plant the coal would be brought from the source of supply by elevators or drags, and fed to the furnace without hand labor, and that the ashes would be carried to or dumped into a pocket, where they could be easily loaded into cars in the same way. No pokers, slice bars or other similar tools should be needed.

The illustrations which will be re-

brought to the hopper 20, Fig. 1, by a drag, spout or any other convenient method, feeds down by gravity over the fire brick 14 on to the traveling grate. The coal is carried slowly at the rate of from $3\frac{1}{2}$ to 5 feet per hour toward the other end. In the beginning of the operation the coal on the right hand side of the furnace is ignited, the other part being covered with ashes or partially consumed coal. After the furnace is heated, the fire brick 14, which we call the "ignition brick," becomes hot, and the coal, passing down under the regulating gate 21, becomes gradually heated, and by the time it reaches the foot of the ignition brick is incandescent. In some cases the coal becomes hot enough to ignite soon after it passes the regulating gate 21. Under the grate there are a number of chambers made of sheet iron which are closed on all sides except on top. The blast from the fan which is used to furnish the air is blown into the large air chamber, which is the second one from the right. These air chambers are open on

pressure of blast sufficient to ignite it, but not too strong to impede ignition.

In order to regulate exactly the pressure of the air in each of the compartments the partitions are provided with registers, by the simple opening and closing of which the pressure in the air chambers can be varied to suit the conditions.

As the thoroughly ignited coal passes slowly over the second compartment (where the air pressure is a maximum), it burns briskly, and then slowly passes over the third compartment, where the air pressure is less and better suited to the combustion of the thinner layer of partly consumed coal. The bed continues to diminish in carbon, and to be subjected to less blast, until, finally, the hot ashes are cooled off (before being dumped) by a very gentle current of air, which is heated and mingles with the carbonic oxide produced in the zone of intense combustion B and converts it into carbonic acid, the object being to subject the coal as soon as it arrives on the grate to a pressure of blast which is

the proper one to ignite it; then burn it with a blast as strong as will produce good combustion, and as the carbon is eliminated and the thickness of the bed becomes smaller, to diminish the blast to correspond to these conditions. The mass of coal remains all the time in practically the same position and condition in which it was placed on the grate, except so far as altered by the combustion. It is evident that there would be a tendency of the air to pass out between the brick rest 13 and the top of the grate bars 19, which have no coal on them, and if

end of the boiler is closed by a sheet iron casing, which passes down into the water in the water pan, thereby preventing the air from passing out between the brick rest 13 and the grate bars into the free air. There is space enough between the extreme right hand end of the water pan and the vertical wall of the casing to allow any ashes or dirt that may accumulate in the water pan to be taken out very easily.

From this brief description the continuous action of the furnace can be easily understood. The coal passing continuously down from the ignition

of air blown through is not sufficient to properly consume all the carbon and the incandescent carbon decomposes the carbonic acid, forming carbonic oxide, very much as in gas producers. This carbonic oxide is burned in the furnace by the air which has passed through the ash. Our experiments have shown us that if we allow the gases to pass through the furnaces with a velocity that will permit the carbonic oxide to burn completely before reaching the parts of the furnace too cool for the combustion to take place, we get a better result, and in one of our plants we have found an increase in efficiency and economy by putting a damper in the stack and checking the flow of gases. Of course, there is a velocity for each furnace above or below which you have less economy and less efficiency, provided you are burning a certain number of pounds of coal per hour. Having thus briefly described the process, I will now give some details as to the construction of the grate and the method of placing it under the boilers.

One of the first difficulties we encountered in our experiments with the traveling grate was the fact that if we had a fire brick side wall there would be a tendency to form clinker along it. This clinker would retard the coal that should be carried forward, and have a tendency to break up the fire near the walls and allow the air to escape, giving considerable trouble. This has been avoided by making the sides of a hollow cast iron bar, called the water back. This bar is horizontal on the bottom, but the upper part rises at the rate of $\frac{1}{4}$ inch to the foot toward the front end, which is also the hottest end. The water is fed in at the back end and flows out at the top at the front.

Our experiments with the Stirling boilers show us that if we pass the feed water which is necessary to supply the boilers through this water back on each side the water leaves the water back at a temperature of 110° to 120° . This goes directly to the feed pump, and the heat is all utilized. We also found that the coal had a tendency to burn a little more rapidly along the water backs, so that the layer of partially consumed coal became thinner there more quickly than in the center, thus allowing a too free passage to the air at that point. This has been avoided in two ways: 1, By having no holes in the grate bar at that point; 2, by making the water back narrower at the top than at the bottom, which gives a larger quantity of coal to be consumed along the water back, so that, if anything, the tendency is to have the layer of ashes there a little thicker than in the center. It is also important that there should be practically a tight joint between the end of the bar and the side along which it slides. This is accomplished by having a casting, 5, a portion of which, forming an inclined plane, makes the fixed side. The joint is made by round bars of iron cut in sections about 1 foot long. This bar of iron rests on the inclined plane and rolls against the end of the bar 18. If one bar, 18, protrudes more than another it simply pushes this iron bar, 43, back; if it recedes the iron bar follows it down. If the bars 43 were all cut off square at their ends, the moving grate bars, if not exactly of the same length, might catch upon them if one projected a little beyond the other; the bars 43 are, therefore, rounded off at the end. Since we have adopted this plan we have had no trouble whatever with the leakage of air.

The grate is formed of two parts; the

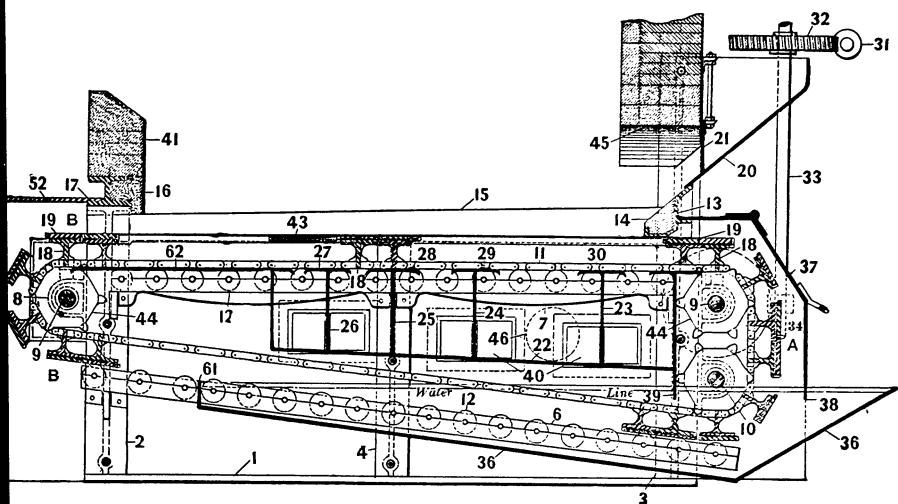


Fig. 2.—Section of Automatic Stoker.

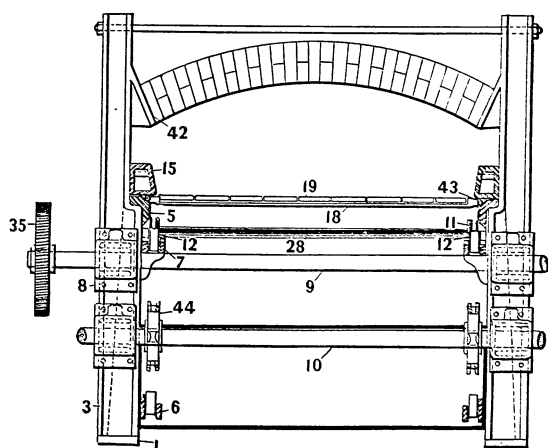


Fig. 3.—Cross Section Automatic Stoker.

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no provision was made to prevent it the air would pass under the air chamber along the line of travel of the grate and enter the furnace through the ash exit at 17, thus forcing a large excess of air into the space under the boiler and causing a loss in two ways: 1, In the power necessary to furnish the air, and 2, in the heat carried off by the surplus of air going out the stack. This is avoided by having the returning line of grate pass into a water pan, 36. By means of the partition 39, which passes down below the surface of the water, a water seal is obtained which absolutely cuts off all connection between the front and back ends of the lower portion of the furnace along the line of travel of the grate. The ash pit, which is practically the part to the left of the plate 39, is closed by a door out of which the ashes are taken and the front

brick is ignited gradually, burned out, and the ashes are carried off or dumped by the grate bars as they descend.

The coal burns out from the bottom; that is, the first thin layer of complete ash forms on the bottom and gradually becomes thicker until it reaches to the top. At first the ash is very hot, but the gentle current of air passing through it gradually cools it off, and when it is dumped into the ash pit it is not very hot. The shaded portion beginning in C and extending into D represents the gradual formation of the ash, and the part to the left of that shows the ash practically cooled or cooling.

A certain portion of air from which the oxygen is not removed passes through and cools the ash, but in the first sections of the bed of fuel near A a certain amount of carbonic oxide is formed, due to the fact that the amount

lower, 18, which is T-shaped, consisting of the vertical rib and the horizontal plate. The horizontal plate is perforated with a number of conical shaped holes, wider at the bottom than at the top, as shown in the drawing. At each end is a lug, which fits into the chain 11. There are two holes cast in the bar, and two holes drilled in the alternate or long links of the chain, and by means of two bolts each end of the bar is fastened to the chains. The upper part of the bar 19 consists of square plates, which are about $7\frac{1}{2}$ inches square. The holes in these are wider at the top than at the bottom. They are simply placed upon 18, being separated $\frac{1}{4}$ inch from it by three little stops, 55, which makes an air space about $\frac{1}{4}$ inch high between the plates. The holes are so arranged that the lower ones are immediately under the center of the solid parts of 19. In this way it is impossible for the coal, no matter how fine, to roll through, as the natural slope of the coal will not reach the openings in 18. In order to hold them in their places two clinch pins, 54, of soft iron are cast into 19. The plates 19 are simply placed in position over 18, and, with a couple of strokes of the hammer, the soft iron clinch pins are bent, as shown, thus holding the upper part of the bar firmly in its place and allowing it to be removed easily when necessary. It will be observed that 19 projects a little over 18 on the left hand side and that 18 projects beyond 19 on the right hand side, so that when two complete bars are together they overlap and close the joints so that no coal can fall through. By constructing the grate in this way the only parts exposed to the hot fire are the small square plates 19 on top. The main or carrying bar 18 is pretty well protected from the intense heat, does not warp or twist, and shows, so far, no sign of giving out; this is very important. The expansion is also taken care of.

Figs. 4 and 5 show the plant at Oneida No. 3. It consists of two 150 horse-power Stirling boilers of the ordinary type to which this grate has been applied. In this case the fire brick arch 60 covers almost the whole of the grate, and the gases from the entire grate mingle at the outlet. The result of having this fire brick arch is to keep up an intense heat over the grate, giving a chance for most of the carbonic oxide to unite with the oxygen of the free air before the gases become cold by contact with the heated surface of the boiler. It appears probable that it will be an advantage to remove the heating surface of the boiler from the combustion chamber, so that the gases will not come in contact with the cooler iron surface until the carbonic oxide has been entirely burned and a thorough mingling of all the gases has taken place. In this case the plant, which will consist eventually of several batteries of boilers, is so arranged that a drag will carry the coal into a coal hopper in front of each boiler, and that the ashes will drop into an ash pit, 50, in each battery, from which they will be loaded into a car when the pit is full by simply opening the gate at the end of the pit and scraping them out.

This drawing also shows the method by which the engine drives the fan 59 and the shaft upon which the cone pulleys 49 are situated. These cone pulleys drive the cone pulleys 48 by which the worm gearing is actuated. They enable us to change the speed of the grate without changing that of the fan, and to change the speed of the

fan without that of the grate, as the relation between these two speeds varies with the character and size of the coal.

The main shaft of the engine by means of worm gearing drives the drag

We have been running successfully the oldest plant about eight months. We have made many improvements, principally in the line of simplification and elimination of unnecessary parts.

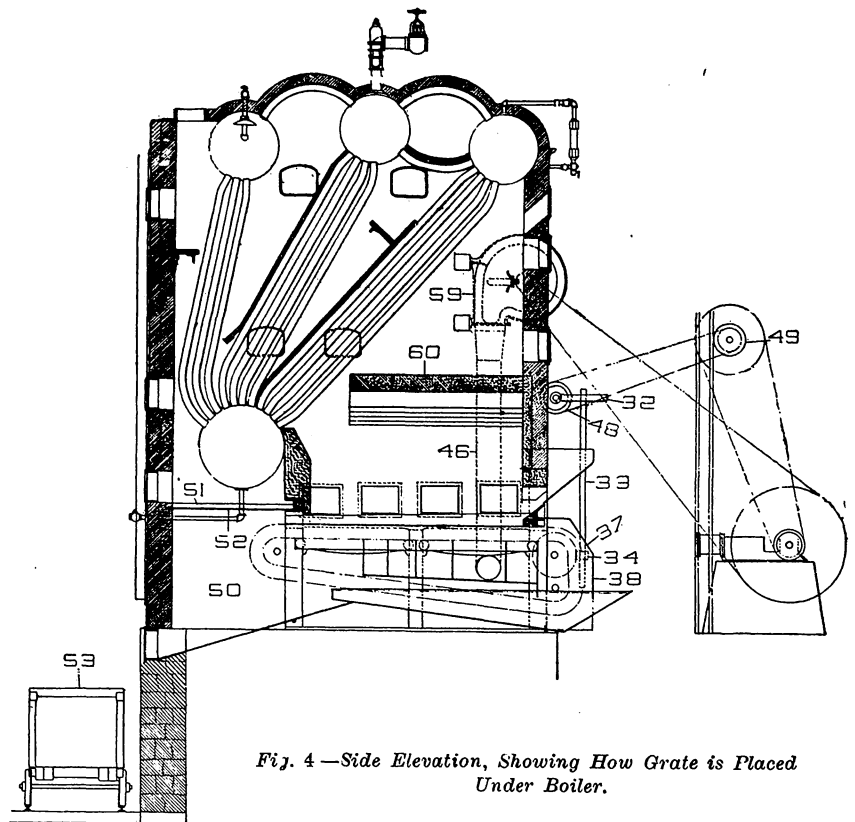


Fig. 4.—Side Elevation, Showing How Grate is Placed Under Boiler.

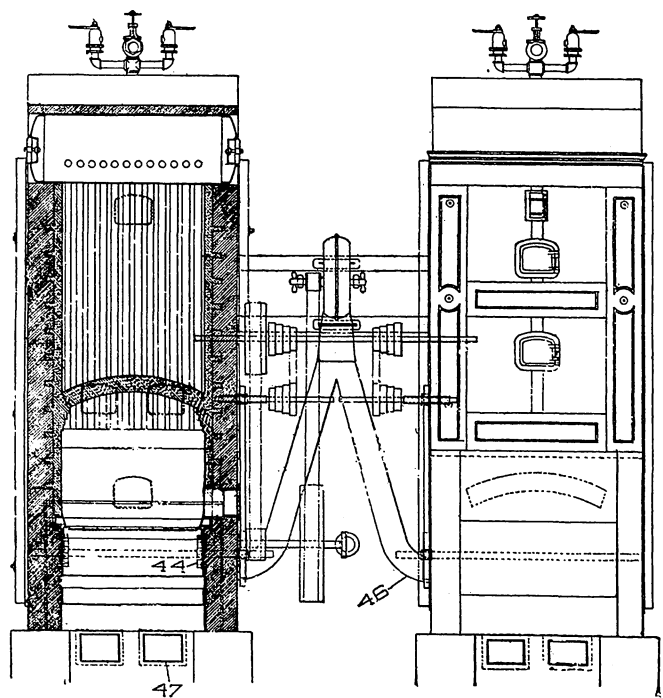


Fig. 5.—Cross Section of Fig. 4.

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that is to carry the coal into the coal hopper.

The method by which the air is carried from the fan into the middle compartment of each grate is also shown on this plate. In this case the coal is fed in front and the ashes taken out at the back of the boilers.

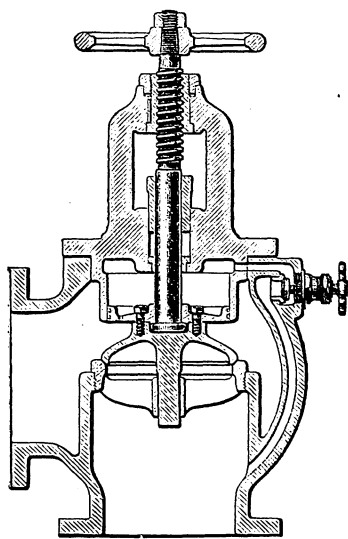
Since we erected the Stirling boilers, some six weeks ago, we have been making experiments with them, using different sizes of coal. We do not claim that these results are complete and absolutely accurate. They are correct as far as they could be under the circumstances. We have not as yet arranged

to analyze our stack gases or determine to our own satisfaction the moisture in our steam. We are engaged in this at present, but we do not wish to give the results until we have verified them by repeated experiments and checked up the calorimeter. The moisture is about 2 per cent. We have, we think, established one fact, and that is that the size of the coal does not materially affect the number of pounds of water evaporated per pound of combustible. It does affect the number of pounds of water evaporated per square foot of heating surface.

In the course of these tests it has been shown to our satisfaction that the best results would probably be obtained by extending the air chambers to as near the dumping end of the grate as possible, and regulating by the registers the pressure (which may be very slight) in the last air chamber, so that a small amount of air may pass through the ash as near to the dump as possible. The amount of carbon in the ash can, we think, be diminished materially by attention to this point. In the new plants now under construction we are extending the air chambers further toward the dump than we did with those with which the experiments were made.

The Schutte Balanced Steam Valve.

This valve, made by L. Schutte of Philadelphia, is here shown in section. The balancing feature in heavy valves



The Schutte Balanced Valve.

is designed to facilitate the operations of opening and closing them while under heavy steam pressure, and to relieve the strain or friction on the screw spindle. The balance in the Schutte valve is obtained by means of a small auxiliary valve inserted in the body of the main valve, having a separate steam way leading to the piston plate above the valve, which plate is made to fit loosely. By opening this side valve the pressure below the valve and above the plate will be even, no matter whether live steam is exerted below or above the valve. The valve and piston plate being of even diameter, the valve becomes practically balanced and the main valve is opened or closed with little effort. The small auxiliary valve is sometimes placed on top of the main valve, with a passage through it, in

which case the valve forms part of the spindle, with sufficient lost motion, and is operated by the spindle. This arrangement, however, is practicable and desirable only when the steam pressure is on the top of the valve, leaving a small overpressure downward. The valves are made in both globe and angle patterns.

THE WEEK.

The Manchester Ship Canal will be formally opened for traffic on December 7.

By a recent decision of the Supreme Court of the United States the great lakes are comprehended within the term "high seas." Justice Field, in delivering this opinion, stated that there has been an advance and development as respects the doctrine of high seas, and that as used in the act of Congress it means water over which no particular State has jurisdiction.

The growth of the shipping interests of the great lakes during the past six years has been of a very striking character. From the annual report of the Commissioner of Navigation just issued it is shown that the tonnage which passed through the Detroit River during the year 1892 amounted to 34,785,000 tons, whereas the tonnage which passed through the Suez Canal during the same year amounted to only 7,712,028 tons. The Lake Superior tonnage, which passes through the St. Mary's Falls Canal, increased from 5,130,659 tons in 1888 to 10,647,203 tons in 1893. The cost of transporting grain from Chicago to New York by lake, canal and Hudson River fell from 28½ cents in 1862 to 7½ cents in 1893.

The total strength of the United States army on September 30, 1893, was 2144 officers and 25,778 enlisted men. For various causes the army lost 9456 enlisted men during the year and gained 9074 recruits.

The Commercial Cable Company have signed a contract with Siemens Bros. for a new Atlantic cable, to be laid next spring, between Ireland and Nova Scotia. It will be 2200 miles in length and will have the greatest known carrying capacity.

The Bishop of Urgel, in the European republic of Andorra, recently prohibited and anathematized the installation of telephonic apparatus and other supernatural and diabolical electrical necromancy.

Work was begun last week on a new steel bridge to be erected over the Monongahela River at Brown's Station, near Pittsburgh, Pa. The bridge is being built in order to afford facilities for connecting Pittsburgh and Homestead by means of two electric railroads.

Lord Charles Beresford claims that England needs to expend at least \$100,000,000 on her navy within the next three or four years in order to bring it up to an equality with that of any other two powers. The naval force of France, his Lordship asserts, is already superior to Great Britain in some directions, notably in the matter of torpedo vessels.

Sir Edward Watkin, the English railway magnate and promoter of the English Channel tunnel, the great Watkin tower—now rising near London—and other gigantic schemes, is now actively

engaged in pushing a project for cutting a canal across Ireland, from Dublin to Galway Bay, in order to shorten the route from England to the United States.

Idle miners in Northern Michigan are said to be becoming desperate. Thousands of them, who have had no work since spring, are, with their families, in a state of destitution; cold and disease having lately added to their sufferings. Governor Rich has invited the mayors of the principal cities in Michigan to meet in Detroit with the view of taking action to relieve the distress. From indications it is believed that 10,000 to 15,000 will have to be fed and clothed until spring, as none of the mines can start much before that time.

An interesting feature of the International Exhibition to be opened at Antwerp in May, 1894, will be the exposition, or competition for prizes, of the packing of goods in cases. It is intended to bring out the best methods of packing for various kinds of merchandise.

A San Francisco firm have just ordered 25,000 tons of coal from Tonquin for use by California railroads. Tonquinese coal has for some time been in use in the French navy with excellent results.

Dispatches from the Pacific Coast report that the new United States cruiser "Olympia" in her official run, November 27, made for 30 miles an average speed of 22.25 knots an hour, while for 13 miles of the distance a speed of 25.59 knots per hour was recorded by the patent log. The "Olympia" will evidently be a worthy mate for her Eastern built sister the "Columbia."

November's fire losses show a continuation of the enormous figures recorded for each month of this year. The total fire waste of this country will probably pass the \$150,000,000 mark before the end of the year; a state of things unparalleled since the big Chicago conflagration.

Destitution among negroes, which is so marked in many parts of the country, discloses the fact that, owing to the general distress, white men are this winter doing work that only negroes did a year ago.

The Colorado Irrigating Company have projected a canal to irrigate 1,200,000 acres of land in the Salton Desert of that State. The water will be conveyed from the Colorado River, the total length of the canal being about 400 miles, and the estimated cost \$5,000,000. Should water be placed on the tract in question, its value would be raised to about \$20,000,000.

Sudden cold in the West has caused great suffering, owing to the scarcity of coal which exists in nearly every part of the interior. In many parts of Kansas and Oklahoma coal is entirely unobtainable.

The California Midwinter Fair will have a Ferris Wheel of its own, the necessary castings for which have been made at the Fulton Engineering & Shipbuilding Works, San Francisco. The wheel will be 120 feet in diameter, and will form one of the attractive features of the Golden Gate Park this winter.

A circumstance, which is quoted as an illustration of the effects of hard times, is that the sales of postage stamps in New York in November were less by nearly \$50,000 than those in November, 1892.

The Iron Age

New York, Thursday, December 7, 1893.

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CHAS. KIRCHHOFF, - - EDITOR.
GEO. W. COPE, - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS, - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

Western Freight Discrimination.

Adverse discrimination by local railroads has been a long standing complaint of Northern producers. Some of the Eastern railroad systems have yielded to the pressure steadily applied by their local patrons and have made equitable rates on commodities manufactured along those lines, but Western managers have been stubborn, and such concessions as they have made up to this time have only been aggravations. There are signs now, however, of a radical change in this policy. Intimations have been given from influential quarters that on at least important business originating at Chicago the interests of the local producers are to be more carefully regarded than has thus far been the case. Whether the policy thus to be changed will have a wider bearing and will characterize Western roads generally cannot now be foretold, but there is good reason to expect a movement of this kind to be somewhat general within the limits of the great traffic associations having their headquarters at Chicago. A change in this respect may bear heavily on the distant producers who are now favored with disproportionately low freight rates on through shipments, but they will have no real ground of complaint if the change is made, especially if local producers are merely put on a perfect equality with themselves.

The persistent refusal of Western managers to put local producers on an even footing with outside competitors in reaching markets further west or northwest shows how deep seated a certain practice can become in railroad management. The growth of manufactures has been very rapid at Chicago and other Western points within the past five years. Commodities are now manufactured in abundance which at that time were largely supplied from other sections of the country. Having supplied local requirements, these commodities seek a market for the surplus, which is naturally further west and northwest. They are confronted, however, with the fact that under certain moss-grown arrangements their own local roads prorate with lines from competing producing districts on such terms as to give their competitors a much lower rate than they can secure to the same points. This is particularly true in pig iron, but also applies to bar iron, nails, and in fact to iron and steel commodities generally. To reach

Western or Northwestern markets manufacturers at Chicago or other points in that vicinity must pay from 25 to 50 per cent. more freight than their competitors on such business pay for that part of their haul over the same track and, perhaps, in the same train, drawn by the same engine. This policy is a relic of the days when manufactures in Indiana and Illinois were confined to the local demands of the community and those States were almost exclusively consumers of staple goods. Freight rates were then devised to meet the conditions existing in the local jobbing trade and, perhaps, were satisfactory at the time. Now, however, both jobbing and manufacturing interests have outgrown the arrangements then made and have long since been ripe for a change.

The plea for fair treatment made by these interests is one that appeals to everybody's sense of justice. There are territorial advantages which ought to inure to the benefit of those located in that territory. A distant producer must expect to be handicapped to some extent in endeavoring to secure business in competition with them. Perhaps he may have compensating advantages in cheaper materials or labor, so that he can overcome the natural difference in freight and offer his product at an even or lower rate at the very door of the local manufacturers. Surely he ought not to complain if he is obliged to pay the same freight rates as those manufacturers when he goes further on and competes with them in territory beyond. This is the point for which many Northern manufacturers have been long contending. The day may come when they will expect their local roads to go further and give them special rates so as to exclude outside manufacturers. Their attitude would then be indefensible from a rational standpoint. But their present demand to be placed on merely an even footing with distant competitors is just and reasonable.

A good deal of serious thought is being given to the very grave question of how to take care of the unemployed during the coming winter. In every community there are many men who are initiating measures looking toward relief. Naturally the different boards of trade are taking the matter into their hands. While, of course, local circumstances must govern the action of such bodies, it would seem that some interchange of opinions ought to take place between their representatives. A good many very important questions of common interest might be very profitably discussed. Delegates of the boards of trade of the great divisions of the country should assemble at such convenient points as Philadelphia, Chicago, Denver and Nashville, to exchange estimates of the magnitude of the misfortunes which they must soon alleviate, and discuss the best and safest methods of reducing distress among the worthy to a minimum. It needs only the invitation of

a few leading chambers of commerce or boards of trade to bring about such gatherings, which might do so much good.

The Mesaba Range and Next Year's Prices.

One of the most important factors which will shape the course of prices for steel during the next year will be the Mesaba ore range. The situation is so complicated and is so largely influenced by purely personal considerations that the probable course of events cannot be readily foreseen. Large buyers of ore argue that next year must be one of exceptionally low values. The ore miners, on the other hand, insist that they do not propose to throw away money and that they will be in a position to demand fair prices.

There can be no doubt concerning the ability of the leading Mesaba range mines to put good Bessemer ore into lower lake ports at very low prices, say \$2.75 per ton. It is well known that some of the large mines can do even better than that. In fact, with a 65-cent rate from the mines to Duluth, which will be next year's figure, and a \$1 lake rate, which may be attained, there is at least one mine which can lay down ore at \$2.10, lower lake ports, for standard Bessemer. The mine in question is the Mountain Iron, a fee mine, which has no royalty to pay. It is understood that the Rockefeller interest has purchased next season's output of this mine at 50 cents on cars, which would place the cost at, say, \$2.35 delivered. The Rockefeller interest is identified with the syndicate which controls the Mountain Iron mine, the Duluth, Mesaba & Northern Railroad and the fee in a number of other large properties originally held by the Merritts. The syndicate, as such, makes a profit on the haul on the Mountain Iron ore. The Standard Oil party can set the market pace with its block of ore, if it be thought desirable to crowd the other Mesaba mines, which have to pay a royalty of 25 to 65 cents per ton. In some instances the leases of those who now control some of the big mines call for the extraction of a minimum quantity of ore. In one conspicuous case it is 300,000 tons, at 65 cents per ton.

There is a good deal of diversity of opinion on the point to what extent minimum tonnage under the leases prevails. Some authorities estimate it at 2,000,000 and over. Leon Merritt puts it at only 1,000,000 tons. He states that many of the State land leases allow seven years before the payment on a minimum quantity becomes peremptory. In the case of the oldest of these leases there is still two years leeway before the provision in question is in force. Others still have five years of grace. It is claimed that therefore the pressure upon producers will not be as great as is claimed. The point is made that the same mines had the same obligation this year and did

not go under. While this is true, it cannot be denied that the Mesaba mine owners were in very sorry financial straits during the past depression. They may be in possession of great prospective wealth, but were then, and partly are now, closely squeezed. Very little cash was in circulation, the only currency being labor checks, which are now being paid off gradually.

A considerable part of the Mesaba ore brought down this season is still unsold, going to swell the very large quantity of ore at lower lake ports which must still find a purchaser, and which is even to-day a heavy load for the Cleveland banks. These accumulations are a menace to prices for the next season.

On the other side of the question are the following considerations: The capacity of the Mesaba range for production is limited by the ability of the existing roads to handle the tonnage. It is not believed that the two roads will have all the tonnage they can handle, with what one of them does in the way of hauling Vermillion, if they are called upon to carry 2,500,000 tons of Mesaba ore. Such an amount is inadequate, even with the stocks at lower lake ports, to cover the requirements of the Western market, even though consumption be much restricted. The new road which the Minnesota Iron Company propose to build into the Mesaba, in order to avoid the heavy grades on their present branch, cannot be completed in time to relieve the situation in 1894. Therefore, it is argued, prices will not be as low for the next season as they have been during this year's financial panic.

Some of the Mesaba interests talk of going a good deal further than the mere mining, transportation and marketing of iron ore. They hint that they are perfectly able financially to take care of all the profits until the finished steel goes into the hands of the consumer. In other words they are considering the plan of putting up blast furnaces and following that up with steel works and rolling mills. With the very latest appliances, and a very cheap ore to start with, they claim to be able to meet any competitor.

That, of course, is a still somewhat distant contingency. What interests the iron trade more at the present moment is what will be the basis of values next year. The principal interests in the Mesaba range are undoubtedly in a position to dictate low prices if that should happen to suit them. It is certain, however, that the producers of the older ranges are not going to stand aside without striking a blow for their share of the markets. If low prices for ore prevail, the pressure which the Western rolling mills and steel works have exerted on the Eastern markets during the present year will continue unabated.

If there be one article upon which a specific duty is absolutely necessary, it is scrap iron. We believe that even

Mr. Wilson himself will recognize that it is as difficult to value this article as it would be to perform a similar operation with the accumulations in a Yankee garret. Scrap iron is collected in all quarters of the globe, and in markets distant from rolling mills or steel works is very low in value. A proper appraisal would be a matter of the greatest difficulty and there might be a very wide difference of opinion among honest men. But if any effort to defraud by undervaluations were made the Government would be practically helpless. Unless a change is made we expect to witness an approach, in the Eastern iron trade, to the condition of affairs in the Dominion, where the finished iron trade is based almost entirely on the reolling of scrap.

Taking Stock.

The usual time for taking stock and making up the final balance sheet for the year in many kinds of business is fast approaching. With its approach, a growing anxiety to know just what the year has brought forth of prosperity or adversity will possess the minds of men to whom the memorable commercial events of the year have already brought anxiety enough. Some of these will undoubtedly have to face a very unsatisfactory result in the aggregate of the year's trade, and very few will be able to congratulate themselves upon large profits gained in 1893. The majority will esteem themselves worthy of congratulation if they have paid all expenses and come out even. All who have been able to do this may feel sure that, with improved conditions of trade certain to come, they can compensate themselves for the trials from which the business of the country is emerging.

Nothing exceeds the annual inventory in importance as related to good business methods. But with oversanguine or timorous men it often is made the source of gross self deception. A man who deceives himself about anything is the most complete of dupes. The man of true courage and commercial ability, however much he may be willing that others may deceive themselves as to what he may be worth financially, is most reluctant to hide from himself the exact condition of his affairs. Therefore, in estimating the value of his assets, if any uncertainty exists as to what any particular asset may be worth he rather estimates it at its lower than its higher possible value.

In manufacturing business where iron founding is a prominent element, assets frequently much overrated are the patterns, flasks, core boxes, &c. These things often cost a great deal of money in the aggregate, and in valuing them from year to year there is a tendency to put down patterns in particular at their original cost, even after they have ceased to be of that value either on account of deterioration, or because the goods they were made for have become more or less unsalable. An element in the value of a pattern is its

present utility as one of the appliances for conducting business. It may, and often does, become merely so much lumber, and, as such, of no value whatever as an asset. As to core boxes and flasks, especially if these be of wood, they deteriorate rapidly in use, and an underestimate of wear and tear may lead to erroneous conclusions in the profit and loss account. An exaggerated valuation of assets has often proved a rock upon which commercial enterprises have been wrecked.

The Cost of Billets.

A rough estimate of the items of cost of converting \$11 pig iron into 4 x 4 soft steel billets is given in the following, on the authority of an experienced steel maker:

<i>Cost of Ingots.</i>	
Pig iron	\$11.00
Waste, deducting value of scrap	1.65
Labor	1.00
Ferromanganese .....	.30
Refractories .....	.30
Molds and stools .....	.30
Fuel .....	.25
Repairs .....	.50

Total ingots.....\$15.30

The cost of rolling ingots to billets is figured as follows:

Ingots.....	\$15.30
Waste, deducting value of scrap.....	.75
Labor.....	.50
Fuel.....	.25
Repairs.....	.25

Total.....\$17.05

It will be observed that this covers only the bare cost of conversion, without any allowance for general expenses and interest on plant. The figures seem to justify those who claim that the cost of conversion is close to \$6 per ton.

It may be well in this connection to call attention to the fact how large a share of the cost is the item of waste. In the figures quoted it aggregates \$2.40. This figure, of course, varies with the first cost of the raw material, so that every statement bearing on the cost of conversion should always be coupled with a report on the price at which the pig iron has been put in. We need hardly state that \$17 billets can only leave the most moderate margin to those who produce their own pig iron at a cost below the market price now ruling, say \$11. The very closest figuring which we have observed lately brings down the cost of pig to the most favored producers to a shade over \$10. When it is considered that this is based on Mesaba ore at \$2.75, lake port, on coke at \$1.10 and on all items down to the lowest point it will be clear that such values have not in them the elements of permanency. Profits all along the line cannot be utterly squeezed out indefinitely. When they do begin to creep back into the accounts their cumulative effect at the end of the line may be easily reflected in jumps of dollars.

Some time since we had the privilege of examining two machines built to special design and intended to do practically the same work. They differed widely, both in design and

construction, and especially in the workmanship. One machine, A, was pronounced by the foreman of the shop to be of most excellent design, to be easily understood and requiring little or no attention—in fact, as he expressed it, he could put any man in the shop in charge of the machine without instruction. The other machine, B, was more complicated in design, required more time in the adjustment of the work and called for the services of one of the best men in the shop and considerable study on his part to run it. The workmanship on this machine was of the highest grade. The cost of the two machines was about as 1 to 2, machine B being the costlier, and the output was in favor of the latter machine in the proportion of about 2 to 3. The point to be brought out is that had the makers of machine B made machine A it would have been, in the opinion of the foreman, perfect, the workmanship on machine A being decidedly inferior; but had machine B been constructed by the builders and designers of machine A, it in all probability would not have worked at all. The whole thing shows that machines of excellent design may originate in shops incapable of doing first-class work, while at the same time establishments noted for accuracy in their workmanship may fail once in a while in the design.

One of the most extraordinary features of the Wilson tariff bill, which is claimed to be the perfection of scientific balancing, is the lack of gradation of duties from the raw to the finished article. Steel billets have a 30 per cent. rate. Wire rods, a step further in manufacture, are the same. Wire, with all its many intricate products, and highest class of material for some purposes, rests on the same basis, although manufactures not otherwise specified take the 35 per cent. rate. Wire nails, which are made from wire, duty 30 per cent., drawn from rods, 30 per cent., rolled from billets, 30 per cent., are put down to 25 per cent., or lower than the whole line of intermediate products from the pig iron, on which the duty is 22½ per cent. Steel billets and slabs, the raw material for a long line of products, have a higher rate of duty than the latter, including cut nails and tacks, fish plates and horseshoe nails, which are put down at 25 per cent. Yet common bars and plates are to carry a duty of 30 per cent. The saw makers have apparently roused the particular ire of the tariff experts. Their product, which requires so much judgment, skill and labor, is supposed to stand up against a 25 per cent. rate, while Mr. Wilson's idea of a proper adjustment gives machine cut files 35 per cent. ad valorem.

A curiosity in corporate literature is the following announcement in a recent list of applications for corporation licenses in Illinois: "Towaxystwo Porzyczkowe I Budowincize M. Kopernika, at Chicago; capital stock, \$1,000,000; incorporators, John Bank, Frank

J. Karch, Bernard Makiewicz, Adam Piasczynski, Frank Marcankowski, Frank Szwadzki and Kazimowski Zychlinski." The population of Chicago is so cosmopolitan that foreign names appear very frequently in applications for licenses to incorporate, but this is, perhaps, the most striking specimen of an unfamiliar dialect to American readers that has thus far graced the official papers of the State of Illinois.

OBITUARY.

JOSEPH D. POTTS.

Joseph D. Potts, who died at Milton, Pa., on the 3d inst., was born at Springton Forge, Chester County, December 4, 1829, and his early life was spent at Pottstown and at Isabella Furnace, Chester County. He drifted away, however, from the occupation of his ancestors and became a civil engineer, as such being connected with various railroads, beginning in May, 1852, upon the Sunbury & Erie. There are two sons living, William M. and Francis L. Potts, each married. Subsequently he was made vice-president of the Steubenville and Indiana Railroad, superintendent of the Western Division of the Pennsylvania Railroad and president of the Western Transportation Company. Upon the breaking out of the civil war Governor Curtin appointed him lieutenant-colonel upon his active staff and chief of the Transportation and Telegraph Department of the State. He held this position from May to December, 1861, at which time the labor of this department was transferred by the State to the Federal Government. Colonel Potts, while serving in 1862 with the militia of the State, called out in consequence of Lee's Antietam expedition, was detailed by General Reynolds as military superintendent of the Franklin Railroad, and performed prompt and valuable service in that capacity.

The next few years constituted the most active and responsible period of an ever busy career. During 1862-65 Colonel Potts served as general manager of the Philadelphia & Erie Railroad for its lessee, the Pennsylvania Railroad Company. From 1865 to 1877 he was president of the Empire Transportation Company, and on February 20, 1871, was elected president of the Erie & Western Transportation Company, the latter still owning and operating a fleet of propellers upon the Great Lakes.

In 1874 he became a managing director in the National Storage Company, and in 1879 president of the National Docks Railway Company, both corporations under the laws of New Jersey. He held these positions until 1884, when he resigned them both. He was elected president of the Enterprise Transit Company in 1871, which position he held until his death. For some years prior to 1885 he was president of the Girard Point Storage Company. He was from their establishment a large owner and a director in the International Navigation Company, who operate the Red Star Line, the Inman and International Line and American Line of ocean steamers.

Of late years Colonel Potts, with the old time family predilection, became interested in the production of iron, he becoming part owner of the Potts Brothers' Iron Company, Limited, of Pottstown, who own and operate a rolling mill in that place. In 1890 he purchased the Chester Pipe & Tube

Works, at Chester. In 1880 he bought the Isabella Furnace property, in the northern part of Chester County, formerly owned by his father.

COL. JOHN L. BROWN.

Col. John L. Brown died at Charlotte, N. C., on the 25th ult., the immediate cause of his death being pneumonia. He had, however, for several years been in feeble health, but was able to be up and about until six weeks before his death. From that time his decline was rapid, and for a week his death was hourly expected. John L. Brown was born in Rowan County, N. C., January 8, 1829. His parents, both of whom were of German lineage, came to Charlotte when Colonel Brown was yet an infant, and he was thus reared in that place. Early in life he began the mercantile career in which he eventually amassed a handsome estate. He established himself in business in 1852, conducting a general merchandise establishment. In 1874 he entered into partnership with the late Col. T. H. Brem, J. H. Weddington and John Van Landingham in the hardware business, the firm name being Brem, Brown & Co. In 1875 this partnership was dissolved and another formed, consisting of Col. Brown and Mr. Weddington, who conducted the business for several years under the style of Brown & Weddington. P. M. Brown, the Colonel's son, was subsequently admitted to the firm, and the style became Brown, Weddington & Co., as at the present time. As a business man, Colonel Brown had the full confidence of his fellow men, and he was in every way regarded as one of the representative business men of Charlotte. As an evidence of the esteem in which he was held, he was thrice called on to represent his county in the State Legislature. Colonel Brown was also a member of the city's Board of Aldermen for 18 years, being also a member of the Board of County Commissioners for several years. He was president of the Mutual Building and Loan Association, a director of the First National Bank, and when the Chamber of Commerce was organized was made its first president. He was appointed by Governor Scales a delegate to the commercial convention held in Atlanta in 1885, and was elected vice-president. In June, 1887, he was elected president of the Board of Trustees of Davidson College, which institution in him always had a warm supporter and friend.

At the new mill of Hughes & Patterson, Philadelphia, the Ridgway steam-hydraulic system is largely used and the latest application of it, which is now being put in place, is one of interest to all owners of bar mills. A section of floor, or hot bed, about 6 x 4 feet is taken out and a Ridgway steam-hydraulic elevator is set in the ground. The elevator is of the direct acting type, and on the ram is placed a platform scale in which the beam is below the platform. The elevator has a lift of about 4 feet. The cast frame on top of the ram of the elevator which supports the scale is rigged with a latch and is made to swing round in any direction. When the iron is rolled it lies upon the hot bed until cold, when it is dragged upon that part of the hot bed over the scale. The elevator is then put in operation and the scale rises, carrying the iron with it. It is but a few seconds' work to read the weight, and the iron being 3 to 4 feet above the floor level is easily and quickly rolled off on to trucks or wagons.

American Society of Mechanical Engineers.

The fourteenth annual convention of this society began last Monday evening at the house of the society, 12 West Thirty-first street, New York. Among those in attendance were the following:

Archer, Edward R., Chief Engineer Tredegar Company, Richmond, Va.
 Baker, Charles F., Boston, Mass.
 Baker, Chas. Whiting, Associate Editor *Engineering News*, New York City.
 Baldwin, Stephen W., New York Agent Pennsylvania and Maryland Steel Companies, New York City.
 Ball, Frank H., Vice-President and General Manager Ball & Wood Company, Elizabeth, N. J.
 Barnaby, Charles W., Superintendent Phoenix Iron Works, Meadville, Pa.
 Barr, John H., Assistant Professor Mechanical Engineering, Sibley College, Cornell University, Ithaca, N. Y.
 Bates, Edward P., Manufacturer Heating Apparatus, Syracuse, N. Y.
 Bayles, Robert Nelson, New York City.
 Bowen, Ernest S., Assistant Superintendent McIntosh, Seymour & Co., Auburn, N. Y.
 Bristol, W. H., Assistant Professor Mathematics Stevens Institute Technology, Hoboken, N. J.
 Brown, Robert A., President and Treasurer New Haven Mfg. Company, New Haven, Conn.
 Burden, James A., President Burden Iron Company, Woodside, Troy, N. Y.
 Camp, Geo. E., Washburn & Moen Mfg. Company, Worcester, Mass.
 Capen, Thomas W., Chief Engineer Fraser & Chalmers, Chicago, Ill.
 Cartwright, Robert, Constructing Engineer, Rochester, N. Y.
 Cary, Albert A., Civil and Mechanical Engineer Abendroth & Root Mfg. Company, New York City.
 Cheney, Walter L., Secretary Meriden Machine Tool Company, Meriden, Conn.
 Christensen, August C., Superintendent Snow Steel Plate Works, Buffalo, N. Y.
 Christie, W. Wallace, Consulting Engineer, Paterson, N. J.
 Clarke, Samuel J., Superintending Engineer Providence & Stonington Steamship Company, New York City.
 Cremer, James M., Brooklyn, N. Y.
 Cruikshank, Barton, Superintendent Roberts Cash Register Company, Harri-man, Tenn.
 Darling, Edward A., Superintendent Buildings and Grounds Columbia College, New York City.
 Davis, Lewis Ketcham, M. E. National Lead Company, New York City.
 Davis, Isaac H., Westinghouse, Church Kerr & Co., New York City.
 Dodge, James M., President Link Belt Engineering Company and Chief Engineer Dodge Coal Storage Company, Nicetown, Philadelphia, Pa.
 Durfee, W. F., Consulting Engineer, West New Brighton, N. Y.
 Fladd, Frederick C., Mechanical Inspector E. W. Bliss Company, Limited, Brooklyn, N. Y.
 Gobeille, Jos. Leon, General Manager and Treasurer the Gobeille Pattern Company, Cleveland, Ohio.
 Gould, W. V., Secretary C. B. Rogers & Co., New York City.
 Granger, Albert Sanford, Foreman Machinery Department C. W. Hunt & Co., West New Brighton, S. I., N. Y.
 Hamilton, James V., Krajewski & Pesant, Brooklyn, N. Y.
 Hartness, James, Assistant Manager and Superintendent Jones & Lamson Machine Company, Springfield, Vt.
 Henderson, Alexander, Chief Engineer United States Navy, Navy Yard, Boston, Mass.
 Henning, Gustavus C., Consulting Engineer, New York City.
 Hill, George, Chief Engineer and Manager Carrere & Hastings, New Brunswick, N. J.
 Hillmann, Gustav, Naval Architect, Brooklyn, N. Y.
 Hoffecker, W. L., Superintendent M. P. Central Railroad of New Jersey, Elizabethport, N. J.
 Holloway, J. F., New York City.
 Hunt, Chas. Wallace, New York City.
 Hutton, Frederic R., Professor Mechan-

ical Engineering School of Mines, Columbia College, and Secretary of the Society, New York City.
 Idell, Frank E., Mechanical Engineer, New York City.
 Jacobus, D. S., Assistant Professor Experimental Mechanics and Shop Work Stevens Institute, Hoboken, N. J.
 Kafer, John C., Passed Assistant Engineer United States Navy, Superintendent, Morgan Iron Works, New York City.
 Kent, William, Consulting Engineer, New York City.
 Kerr, Walter C., Westinghouse, Church, Kerr & Co., New York City.
 Kirchhoff, C., Editor *The Iron Age*, New York.
 Klein, J. F., Professor Mechanical Engineering Lehigh University, Bethlehem, Pa.
 Laforge, Frederick Henry, Chief Inspector Connecticut Mutual S. B. Inspection & Insurance Company, Waterbury, Conn.
 Lyal, William L., Mechanical Engineer and Superintendent J. W. Lyal Mfg. Company, New York City.
 Meatz, John T., Superintendent Mason Machine Works, Taunton, Mass.
 Metcalf, Wm., Pittsburgh, Pa.
 Miller, Alexander, Brown & Miller, Jersey City, N. J.
 Miller, Fred J., Associate Editor *American Machinist*.
 Mitchell, Albert E., Superintendent Motive Power N. Y., L. E. & W. Railway, New York City.
 Montgomery, H. M., Chief Draftsman the Babcock & Wilcox Company, New York City.
 Morse, Chas. M., Mechanical Engineer, Buffalo, N. Y.
 Mumford, Edgar Huidekoper, Henry R. Worthington, Foundry Department, Elizabethport, N. J.
 Nason, Carleton W., President Nason Mfg. Company, New York City.
 Odell, Wm. H., Mechanical Engineer, Yonkers, N. Y.
 Parsons, Frederick W., Superintendent B. W. Payne & Sons, Elmira, N. Y.
 Pentz, Albert D., Elizabeth, N. J.
 Platt, Jos. C., Consulting Engineer, Waterford, N. Y.
 Pusey, Chas. W., President the Pusey & Jones Company, Wilmington, Del.
 Rankin, Thomas L., Engineer De La Vergne Refrigerating Company, New York City.
 Raquie, Philip E., Vice-President and Engineer Atlas Iron Construction Company, New York City.
 Raynal, Alfred H., Superintendent Sam. L. Moore & Sons Company, Elizabeth, N. J.
 Richards, Frank, New York City.
 Roberts, William, Paper Manufacturer, Waltham, Mass.
 Rockwood, Geo. I., Consulting Engineer, Worcester, Mass.
 Roelker, H. B., Mechanical Engineer, New York City.
 Rogers, Winfield S., Mechanical Engineer, Troy, N. Y.
 Scheffler, Theo. Francis, Chief Draftsman Erie City Iron Works, Erie, Pa.
 Sewall, M. W., Superintendent Engineering Department Babcock & Wilcox Company, New York City.
 Sinclair, Geo. M., Midvale Steel Company, Philadelphia, Pa.
 Smith, Chas. F., Mechanical Engineer, Brooklyn, N. Y.
 Spies, Albert, Associate Editor *Cassier's Magazine*, New York City.
 Strangland, B. F., Superintendent Machine Ventilation Howard & Morse, New York City.
 Stillman, Francis Hill, New York City.
 Suplee, Henry Harrison, Mechanical Engineer Yale & Towne Mfg. Company, Stamford, Conn.
 Taylor, John T., Superintending Engineer W. & J. Sloane, New York City.
 Thomson, John, President Neptune Meter Company and John Thomson Press Company, New York City.
 Thorne, Wm. H., Wm. Sellers & Co., Incorporated, Philadelphia, Pa.
 Thurston, Robert H., Director Sibley College, Cornell University, Ithaca, N. Y.
 Tremaine, E. G., Assistant Superintendent Machinery Department P. Lorillard & Co., Jersey City, N. J.
 Wagner, John R., Coxie Bros. & Co., Drifton, Luzerne County, Pa.
 Watson, Wm., Secretary American Academy Arts and Sciences, Boston, Mass.
 Webster, John H., Superintending Engineer American Sugar Refining Company, Boston, Mass.

Weickel, Henry, Chief Draftsman Yale & Towne Mfg. Company, Stamford, Conn.
 Wellman, Samuel T., President Wellman S. & I. Company, Thurlow, Pa.
 West, W. Frank, Morris Heights, New York City.
 Winship, J. G., Mechanical Engineer Geo. F. Blake Mfg. Company, New York City.
 Wolff, Alfred R., Consulting Engineer, New York City.
 Zehnder, Chas. H., President Jackson & Woodin Mfg. Company, Berwick, Pa.

The election of officers for the ensuing year resulted as follows:

President, Eckley B. Coxie.

Vice-presidents, C. E. Billings, Percival Roberts and H. J. Small.

Treasurer, Wm. H. Wiley.

The annual report of the council showed the society to be in a most flourishing condition in every way. The receipts for the year were \$35,663, and the expenditures \$23,019.

The president, Eckley B. Coxie, chose for his address the subject:

The Use of Small Sizes of Anthracite Coal for Generating Steam.

Elsewhere in this issue we give a portion of a paper by Mr. Coxie, presented at the Chicago convention, in which will be found a description of the method of burning small coal. We quote from the address as follows:

When I first remember the anthracite coal business all the sizes below stove coal were considered of little or no value. Chestnut coal was used to a greater or less extent about the collieries for making steam, but much of it was thrown away. It gradually became a domestic fuel, and pea coal took its place for generating steam. This size is gradually coming into use for domestic purposes, and buckwheat coal is taking its place for steam. Two smaller sizes, known as rice and barley, are already being used to a large extent for the same purpose. The value or cost of these coals decreases very rapidly with the size. I append herewith a table showing the size and approximate cost at mines, and the sizes of mesh over which or through which they are made.

Table 1.

Size.	Made through.	Made over.	Approximate price at mines.
	Inch.	Inch.	
Chestnut.....	1½	¾	\$2.75
Pea.....	7-8	9-16	1.25
Buckwheat.....	9-16	¾	.75
Rice.....	3-8	3-16	.25
Barley.....	3-10	3-32	.10

NOTE.—The above meshes are all round punched, and are the standards adopted by Coxie Bros. & Co. at the Cross Creek Collieries.

Another important point to be noted is that the cost of transportation of the small sizes is less than that of the large. From the mines to tide, pea coal is charged 80 cents and buckwheat, rice and barley 50 cents less per ton than the domestic sizes.

One great difficulty encountered in the introduction of these smaller sizes was the fact that, as they were of comparatively little value, but little attention was paid to their preparation, and parties who began to use them did not erect furnaces specially constructed for the purpose, but generally burned them in their old plants, sometimes changing the construction of their grate bars a little.

While the size of the domestic coals made by the different companies are practically the same, there has been a great difference in that of the small coals and in the amount of impurities contained in them. Formerly a large amount of culm was employed where it could be obtained cheaply, but its use is diminishing for the following reason: What was formerly known as culm contained the buckwheat, rice, barley, and in some cases the pea coal. Now, however, the pea, buckwheat, rice, and in some cases the barley, are taken out; and the dust that remains, which forms what is now called culm, although it may still be used by mixing with bituminous coal, or in a special furnace in which it is burned as dust after being thoroughly pulverized, or by making briquettes or compressed fuel, yet it is at present of no value alone and in its natural state for generating steam.

As is well known to all those who burn anthracite, sizing is of great importance. The coal burns only on the surface, and therefore, if the size is not uniform, the smaller particles clog the passages between the larger and thereby prevent a sufficient quantity of air from passing through the furnace. Some of those who have attempted to use buckwheat, rice and barley have given them up, because of the great want of uniformity in the results obtained. The difficulty may be due to one of two causes, or both: 1, To bad sizing, and, 2, to the presence of a large quantity of impurities. Experiments we have made have proved that the percentage of carbon when small anthracites are burned under proper conditions, and not the size, is what determines the amount of water evaporated per pound of coal, but the amount of water evaporated per square foot of heating surface decreases with the size of coal.

Of course it is not practically possible to have the size of the coal absolutely uniform, but the producer should at least guarantee that a certain percentage of the coal sold as rice should be of such size that it would pass through a mesh of a specified diameter and over a mesh of another specified diameter. In other words, with the present light I have upon the subject, if I was in charge of a large steam plant burning, say, 100,000 tons of rice coal per year, I would try to make a contract which would require the coal to contain not over a certain percentage of water and not less than a certain percentage of carbon, or, what is practically the same thing for anthracite, not over a certain percentage of ash, and that a certain percentage of the average daily sample of the coal would pass through a mesh of a certain size and over a mesh of another size, and that the coal should not contain more than a certain percentage of dust—dust being what would pass through a mesh of, say, $\frac{1}{16}$ inch in diameter.

Having reached these conclusions some time ago, I have with my assistant, John R. Wagner, been studying the question of how to determine in a rapid, simple and effective manner, by methods which do not require scientific work except for the analysis of the coal, the actual commercial value of any shipment of these small sizes.

I shall now proceed to describe our methods for doing this work.

As we are producers to a much larger extent than we are consumers of the small anthracites, although we burn between 100,000 and 150,000 tons per year at our collieries and works for generating steam, we have taken up the subject with the view of controlling our

production as well as controlling our consumption, and I shall describe our methods of doing the work, which can easily be adapted by any one receiving coal in cars or boats to their special case.

The foundation of all such work is the obtaining of fair average samples. This is done as follows:

At each of the collieries where the pea, buckwheat, rice and barley are shipped samples of each size are taken several times a day from the loading lips as the coal is running into the cars. These are put into four separate bins, one for each size. At the end of the week the coal in each bin is thoroughly mixed, and is then sampled by quartering down until we obtain about 30 pounds, which is sent in a strong canvas bag to the laboratory, thus obtaining from each breaker an average sample of each of the four sizes each week.

The work of taking samples is under the direction of the coal inspector (one being stationed at each colliery), who inspect all the coal shipped. When cars of small capacity are loaded, of which there are not many now, the samples are sometimes taken from the top of the cars instead of taking them from the lips as the coal runs into the cars. With cars of larger capacity the samples are always taken as the coal runs from the lips, getting in each case a very fair average. In taking samples from the top of the smaller cars, eight or ten ordinary buckets of coal are taken from different parts of the car without paying any special attention to character of the coal at the place it is taken. The coal from the buckets is placed on a platform and quartered down until about one bucketful is obtained, which is put in the bin. In the other case, where the samples are taken as the coal runs from the lips, they are also put in a bucket and carried to the proper bin. Each of the samples obtained may be used for any of the five following operations:

1. Determination of size.
2. Determination of the slate.
3. Determination of the ash, involving in some cases an analysis of the ash.
4. Determination of the water.
5. Rapid commercial determination of the specific gravity of the coal.

Determination of Size.—The object of this operation is to determine the exact size of coal which makes up the sample, as distinguished from its nominal size. The apparatus consists essentially of a cubical box, the top and one side of which are open and into which slides a series of drawers. We generally use five or six. These drawers are wooden frames $1\frac{1}{2}$ inches deep, about 12 inches wide and 14 inches long.

The bottom is a sheet of perforated metal. The box rests upon a circular base of wood, which is coned at the bottom and has in its center a pin with a spherical head, which works in a spherical hole in the center of the wood base. When the pin is placed in the center hole the box can be revolved easily, and in such a way that the axis of the box describes a cone. This shakes the coal and causes it to move from one side of the screen to the other, and, as it can be moved very rapidly, soon sizes the coal. When the drawers have been placed in the box a stick of wood is inserted to prevent the drawers from sliding out. The sizes of the perforations which we usually employ are:

- For the upper screen, $\frac{1}{8}$ inch round.
- For the next lower, $\frac{1}{16}$ inch round.
- For the next lower, $\frac{1}{32}$ inch round.
- For the next lower, $\frac{1}{64}$ inch round.
- For the next lower, 3-32 or 1-16 inch round.

This makes with the dust six sizes. Of course the number of drawers and the size of the perforations can be varied to suit each special case. If the coal is of the ordinary character we can screen about 15 pounds, or about one-half the regular sample brought to laboratory, which is quartered down to obtain the amount necessary to make the determination. It is not necessary to weigh the part to be tested; it is, however, necessary that the entire sample obtained by quartering down should be screened, otherwise you would not have an average sample.

The coal is gradually poured upon the screen while it is revolving. When the operator is satisfied that the coal is thoroughly screened, each drawer is taken out and the quantity in each drawer is weighed, and by simply adding together these weights, the total weight of the sample is obtained. In this way the average percentage of each size is easily found.

Determination of Slate.—While in large coal the percentage of slate can easily be determined by taking the average sample, weighing out, say, 100 pounds of it, picking it over by hand and weighing the amount of slate and bone found, it becomes very difficult to do this with the smaller sizes of coal, as a magnifying glass must be used. This is very trying on the eyes and requires a great deal of time. We sometimes resort to it, but only for the purpose of checking our other process. The method adopted depends upon the difference in the specific gravity of the coal and slate. The specific gravity of a piece of coal increases with the amount of ash that the coal proper contains, and also with the amount of bone or slate attached to it.

We first determine by analysis the composition of the coal, bone and slate from the mine we wish to study, and also find in the usual way the specific gravity of the specimens analyzed. We thus fix a limiting specific gravity, the particles lighter than which may be considered coal, and those heavier, slate or bone; and we make a solution of chloride of zinc of the same specific gravity. This limiting specific gravity, of course, varies with the nature of the coal and the nature of the impurities. The coal from the Lehigh region and some parts of the Schuylkill region is much heavier than that of the other parts of the anthracite field, and the specific gravities of the bone and slate also vary with the locality and vein. We use for our mines a solution with a specific gravity varying from 1.70 to 1.72.

The simplest form of the operation would be to take a large beaker glass nearly filled with the solution of chloride of zinc, and pour slowly into the coal to be examined, stirring it from time to time. The coal floats and the slate goes to the bottom. When the floating coal, which is generally much greater in quantity than the slate, begins to cover the top of the vessel, a portion of it is skimmed off and put in a dish; and this is continued until all the coal to be tested has been poured into the vessel. The remaining coal which is floating is skimmed off with a great deal of care, the chloride of zinc solution poured off, and the slate placed in another vessel. The coal and slate are then washed and dried and weighed, and the percentage of each calculated. This, of course, does very well if only a few determinations are to be made, but where it is necessary, as with us, to make a large number of tests, an apparatus devised to simplify the work may be used with advantage.

As we have constantly occasion to dry coal, which in the ordinary way takes considerable time, a simple apparatus was erected to do the work. It consists essentially of a rectangular iron case about 4 feet long, 26 inches wide and 4 inches high, cast hollow and as thin as possible. This is kept filled with steam; on top of this is placed a box made of wood, in the bottom of which there are two drawers 18 inches long and 16 inches wide. The sides of these drawers are of wood and the bottom of 24-mesh wire gauze. The bottom of the box, which is about 1 inch thick, covers the whole iron plate, and extends about $1\frac{1}{2}$ inches beyond the edge all around. From the outer edge of the cover a canvas curtain about 8 inches long is hung. The drawer is about 1 inch above the iron plate, leaving space for the hot air to pass through. The bottom of the case is cut out where the bottom of the drawer is covered with the gauze, and the whole box rests upon the plate, so that air passes around and over the plate and up through the gauze. The top of the box is closed, with exception of one hole, in which is inserted a sheet iron pipe, which connects with a suction fan. The result is that a constant supply of air passes around the iron plate, through the holes in the wood cover, and then through the gauze to the suction fan; by means of which a very rapid drying at a comparatively low temperature is brought about. In order to dry the coal and slate from the chloride of zinc apparatus, the pipe between the drying apparatus and the fan is enlarged, so that, by removing the cap on the upper part of the enlarged portion of the pipe, the cylinders can be inserted in the enlarged portion, the cover put on, and the drying of this coal and slate carried on without interfering with the drying in the other part of the apparatus. This apparatus is very simple and inexpensive, and is very satisfactory and thorough in its work.

Analysis of the Ash.—The sample which comes from the colliery in the canvas bag, on reaching the sample room of the laboratory is divided into two parts, one of which is dried (should it be wet) in the apparatus already described, and then goes to the pulverizer. The pulverizer consists of a cast iron cylindrical shell, 12 inches long and 16 inches in diameter (both inside), through the center of which passes an iron shaft, and inside of it are 16 chilled cast iron balls 3 inches in diameter. The cylinder makes from 70 to 150 revolutions per minute, according to the number of samples to be prepared. Along the surface of the cylinder, and parallel to the axis, runs a slot which is $\frac{3}{4}$ inch wide on the inside and $1\frac{1}{2}$ inches wide on the outside. This is closed by a wrought iron wedge, which is held by two clamps placed near each end. The coal is introduced by bringing the slot to the top and pouring it in, and is removed by bringing the slot to the bottom and allowing it to run out, the cylinder being oscillated backward and forward in order to remove all the stuff, which is received in a Russia iron pan 24 inches long and 18 inches wide. In this way practically the whole of the pulverized product can be rapidly removed. We generally put about 15 pounds into the pulverizer at once. Running at a moderate speed it takes about $1\frac{1}{2}$ hours to pulverize 15 pounds of pea coal thoroughly; but, by crushing it in a mortar so that the coal will pass through a $\frac{1}{8}$ round mesh, this time can be very materially reduced. Buck-

wheat, rice and barley are pulverized without any previous hand crushing. Rice and barley require only about three-quarters of an hour.

The pulverizer is a very simple, cheap and effective machine. The surfaces of the slot are planed, as is also the wedge, making a perfectly tight joint, and not allowing any dust to escape.

The pulverized coal received in the pan is quartered down to about 1 pint, which is screened on a No. 60 mesh sieve; 90 per cent. generally passing through; and that which does not pass through is crushed finer by hand on a rubbing plate, requiring but a few minutes.

But attention having been called to the discrepancies in analysis where we attempted rapid crushing, we made a series of careful experiments (the results of which are given in the following table) to satisfy ourselves as to the facts. The first column gives the sizes of coal, the second column gives the percentage of ash when the proper method of sampling is adopted, the third column gives the results when the rapid method of sampling was adopted, and the fourth column gives the difference in each case:

Results of Comparison of Two Methods of Obtaining the Powdered Samples, for Analysis.

Size.	Method "A." Per cent. of ash.	Method "B." Per cent. of ash.	Difference. Per cent.
Lump coal.....	5.00	6.65	1.65
Broken coal.....	7.52	9.97	2.47
Egg coal.....	8.50	11.12	2.62
Stove coal.....	8.39	10.15	1.76
Chestnut coal.....	9.50	12.87	3.37
Pea.....	11.45	14.95	3.50
Buckwheat.....	9.87	11.27	1.40
Rice.....	13.85	17.95	4.10
Barley.....	13.05	23.95	10.90

It will be observed that the difference was as much as 84 per cent. in the last case. The reason of this is probably that a large portion of the impurities in coal, such as iron pyrites, silica and substances of a clayey nature, occur in very light incrustations upon the surfaces of fracture of the coal.

Proximate Analysis of the Coal.—For commercial purposes, which is the point of view from which I am treating this subject, only a proximate analysis of the coal is generally necessary—that is, an analysis by which the moisture, volatile combustible matter and ash are determined, the carbon being determined by difference. It is necessary only occasionally to determine the sulphur, and more rarely the composition of the ash, as the sulphur and the composition of the ash do not vary in the coal from one colliery as much as the percentage of ash. It would not be necessary to determine very often the moisture and volatile combustible matter were it not that without them the amount of fixed carbon cannot be arrived at.

The sample, which has been pulverized and quartered down until it will about fill a pint measure, is sent to the analytical room, where it is subjected to the following operations:

1. Determination of ash.
2. Determination of moisture.
3. Determination of volatile combustible matter.
4. Determination of sulphur.
5. Analysis of ash.

Moisture Determination.—This is done in a very simple apparatus constructed as follows:

Two 1-inch boards, 12 inches wide and about 8 inches high, with the upper corners rounded off, form the back and front. In each of these boards there is cut an opening 10 inches wide and $4\frac{1}{2}$ inches high, also rounded, in which there is placed a copper muffle made of sheet copper $\frac{1}{8}$ -inch thick, simply bent in the form desired and riveted at the joint, and open at both ends. This is tacked to the two boards. Both the front and back of this muffle are closed by a piece of asbestos board supported on two tacks. Another piece of asbestos board is bent around so as to form the sides and top, leaving a space between it and the muffle about 1 inch wide. Underneath the muffle are three very small gas jets formed by making three small perforations in $\frac{1}{2}$ -inch gas pipe. These give the heat which keeps the muffle hot. A thermometer passes through the top of the muffle and the asbestos board top, and shows the heat in the muffle. The piece of asbestos board at the back is not taken off; that in front is removable in order to allow the sample to be put in. By means of these gas jets the temperature is kept at about 225° F., and remains remarkably constant with but very little attention. Any ordinary mechanic can construct this apparatus in a few hours.

The sample when weighed out is placed in the muffle, and remains at a temperature of 225° for about one hour, experience having shown us that this time and this temperature are best suited for determining the moisture in our anthracites. Notwithstanding the extreme simplicity and low cost of the apparatus, it gives results which are very satisfactory.

Determination of Volatile Combustible Matter.—For this determination, the method usually adopted is to heat the sample in a covered platinum crucible for $3\frac{1}{2}$ minutes by an ordinary Bunsen burner, and then, without cooling, for $3\frac{1}{2}$ minutes more with a blast burner. We find it very convenient to adopt a crucible of special shape provided with a flanged sleeve. The crucible is 1 inch in diameter, $2\frac{1}{2}$ inches deep, and cylindrical for the length of $1\frac{1}{2}$ inches. It has a wire rim at the top, and fits loosely into a sleeve which bears against the rim. The sleeve is beaded on top to keep it cylindrical, and $\frac{1}{2}$ inch below the top of the sleeve there is a thin annular disk of platinum, which is fused to the other part of the sleeve. The crucible, with this thin sleeve, is supported by a platinum wire triangle placed over a clay cylinder, and which in its turn is supported by a ring of the filter stand at a height suitable to the height of the burner. The clay cylinder is $3\frac{1}{2}$ inches high, with a hole 2 inches in diameter at the top, and tapering down to $1\frac{3}{8}$ inches at 1 inch from the bottom, and from there down widening out again to $1\frac{1}{2}$ inches. The sleeve prevents the crucible from slipping through the wire triangle or the holes in the desiccator and from tilting over on the wires. It also helps in heating it to the highest possible temperature for the full length, as it baffles the flame. This sleeve is also very convenient for lifting the crucible from the cylinder into the desiccator, and from thence into the scale pan, as the operator simply grasps the disk of the sleeve with an ordinary pair of forceps. It weighs 9 grams. We also use the same crucible and sleeve for fusions when making complete analyses of the ash.

Determination of Sulphur.—This is done by Eschka's method, with one exception; that is, we use a different form of crucible, in the shape of a small lipped and wire rimmed beaker of platinum, holding about three and one-third times as much as the ones usually employed. It is $2\frac{1}{2}$ inches high, 2 inches in diameter, and tapering slightly toward the bottom. By using a larger crucible all the operations of oxidation, acidulating, oxidizing with bromine, and driving off excess of the latter, &c., can be performed without transferring or washing the beaker, this saving considerable time.

Analysis of the Ash.—This, of course, is a comparatively long operation, and is done in the ordinary way.

Rough Determination of Specific Gravity.—This, though a comparatively simple and to all appearances rough operation, promises to be of value to producers and users of anthracite coals. The apparatus we employ is constructed as follows:

It consists of four parts, an ordinary sheet iron bucket such as is used about the works for sand or ashes, and holding about 25 pounds, an ordinary washtub, a Fairbank's market beam scale and a cylindrical tin pan about 14 inches in diameter and 7 inches deep.

The weighing beam is attached to the post by means of a small crane, which throws it out from the post. The ordinary hook used for suspending material to be weighed carries a yoke, from which the tin pan is suspended by two wires. The bucket is also hung on the same hook.

The tub is then filled with water until the tin pan is covered, and the whole is then balanced by means of a weight hung on the outer end of the beam, which weight remains constant. The poise used for weighing moves along the beam in the ordinary way. The beam is divided into pounds and quarter pounds, each notch representing $\frac{1}{4}$ pound when the ordinary poise is used. In order to weigh to $\frac{1}{100}$ pound, a little rider made of sheet metal, and of such a weight that each notch represents $\frac{1}{100}$ pound, is used; so that by placing the poise in the notch corresponding to the even pound, which is just less than the actual weight, and then moving the rider until the beam balances, and reading off the number of notches, the actual weight in pounds and $\frac{1}{100}$ pounds is obtained. If, for example, the rider is in the second notch to the right hand of the 10-pound notch, it would read $10\frac{2}{100}$ pounds; that is, the 10 pounds would represent 40 notches, which with the other two would make 42.

When the average specific gravity of a shipment of coal is to be determined specimens are taken from all parts until a fair average sample is obtained. This is spread on a platform and quartered down until the material is reduced to about 20 pounds, which is then put into the bucket.

If we know the average specific gravity of the sizes below egg coal from a certain colliery, and their average percentage of ash, by merely getting the specific gravity of the coal in a number of cars we can determine satisfactorily (we are inclined to think) the percentage of ash by the following formula:

$$y' = y + (x' - x) \times a;$$

in which

x = the standard specific gravity,
 y = the standard percentage of ash,
 x' = the specific gravity of coal determined by our apparatus,
 y' = the percentage of ash to be determined,

a = a constant for coal from same mine.

We have become so thoroughly impressed with the importance of having the specific gravity of all samples of coal which we analyze that, whenever the sample sent to the office is large enough, we obtain the specific gravity in the rough way given above, and find that it adds very materially to the value of the data obtained by analysis.

It seems to me that in all important boiler tests not only the coal used should be analyzed, and a special determination made of the amount of moisture in the coal when it is actually fired, but also that the ashes should be carefully analyzed. The sample for both the analyses should be obtained by quartering down all the coal to be used, and quartering down all the ashes made.

There is another question of very great importance to users of coal, on which I am not, however, ready to say much—that is, the clinkering. It depends undoubtedly upon two points: the temperature at which the coal burns, and the composition of the ash. The fact that a coal does not clinker may be due to its impurity; that is to say, the coal may be so impure that it will not make a fire hot enough to melt the ash, although the composition of the ash may be such that were it contained in a pure coal it would melt easily. On the other hand, the coal may clinker because it is very pure and burns at a very high temperature.

The first paper read Tuesday morning was by Albert K. Mansfield, of Salem, Ohio, on "The Buckeye Valve Gear." As we described this engine in our issue of October 5, 1893, it is not necessary to reprint the paper.

Professor R. H. Thurston of Cornell University read a paper

On the Maximum Contemporary Economy of the High Pressure Multiple Expansion Steam Engine.

We quote as follows:

With improving thermo-dynamic conditions and decreasing wastes in the engine, starting from the 5,000,000 duty of the Savery engines still existing in the time of Watt, the 12,000,000 of Smeaton's Newcomen engine of the same period, and the first figures of Watt, perhaps averaging 20,000,000 foot pounds per pound of fuel, and tracing the improvement through the most flourishing period of Watt's work, when he attained about 30,000,000, and his final perfection of the later Cornish engines, which, still later, attained in ordinary operation 60,000,000 to 80,000,000, we come to the period of successful introduction of the modern forms of the high pressure multiple expansion pumping engine, from 1860, giving duties ranging up to about 100,000,000 to 110,000,000, and to 120,000,000 in the succeeding generation and to date.

The improving thermo-dynamic conditions which have made these results possible have been, first, the gradual elevation of the steam pressure from 5 pounds per square inch in 1800, to 20 pounds in 1840, to 50 at the middle of the century, 75 a quarter of a century later, to 120 and to 150 and 175 in contemporary stationary and marine practice, and even to above 15 atmospheres in some instances. The second and no less essential element of this progress has been the simultaneous rise in the ratio of expansion from the

time of Watt to the present, and from unity in his earliest practice to 4 for the late Cornish form of the Watt engine, to 6 and 8 a generation ago and to 15 and even 20 and more in the latest multiple expansion machines. A terminal absolute pressure of about one-third of an atmosphere probably represents the limit to which expansion has been successfully carried. A higher rather than a lower terminal pressure is usual in the best practice of the day. The third element of improvement has been the increase of speed of piston and of rotation; although this has been less observable in steam pumping engines than in other types. Beginning with 200 to 300 feet per minute speed of piston, the figure has gradually risen to 500 and 600 in later years, and to above 1000 in many cases to-day. These three have been the essential elements of improvement in the real engine; the latter supplementing the two others, which give thermo-dynamic gain. Improvements in design and construction have completed the advances thus made possible.

The latest and highest record of efficiency and duty, one which may very possibly long stand as the highest record—the passage of the date at which the quantity of steam used per hour and per horse-power below 12 pounds (5.5 kg.), constituting an important era in the history of the steam engine—is, on the customary American basis of 100 pounds of fuel, 143,306,470 foot pounds. On the old British basis of 112 pounds (1 hundredweight) it becomes 152,630,000, and on the proposed bases of 1000 pounds feed water converted into dry steam, and of 1,000,000 B. T. U., is 152,448,000 and 137,656,000, respectively. For kilogram-meters of work per kilogram of fuel, the figure becomes 429,110. These figures, compared with those of the preceding paragraph, will complete the record of progress to date, and perhaps indicate practically the limit of advance for the nineteenth century in this department of human achievement. It still leaves us a margin of nearly 20 per cent. between the ideal and the real case for further gain; the thermo-dynamic case, assuming similar pressures and ratio of expansion, demanding nearly 10 pounds of steam per horse-power per hour and giving a duty of close upon 175,000 on the first named basis and about 200,000,000 on the highest standard. The ideal and the real efficiencies correspond, respectively, to fuel consumptions of 1.1 and 1.8 pounds per horse-power per hour with good boilers.

Our "real case," the Milwaukee pumping engine, built for that city by the E. P. Allis Company, from the designs of Mr. Reynolds, has been in operation since August, 1891, doing continuously so high a duty as to place it among the most remarkable constructions of its class and time, and probably to make its record the highest on record to date. It draws water from Lake Michigan and forces it into the city mains under a head of about 160 feet, into a reservoir, from which other engines raise it into a still higher level, so far as needed for consumption at greater elevations. The engine here under consideration is at the North Point station, at the level of the lake, very nearly. The station contains also a pair of compound engines, built in 1874, which gave a duty, originally, without cut off on the low pressure cylinder of 77,000,000 on 100 pounds of coal. After fitting this cylinder with cut off gear, the duty rose to above 85,000,000. The pump-

raises about 900 gallons per minute, with a slip of 2 per cent. There is also, besides these, a compound engine by Allis & Co., built in 1884, delivering 12,000,000 gallons per day against a head of 150 feet, and with a duty reported by Mr. Benzenberg, the city engineer, from test, of 104,820,431 foot pounds per 100 pounds of best coal. The latest of the collection is that here to be examined—a triple expansion engine built to raise 18,000,000 gallons per day of 24 hours, guaranteed by its builders to perform a duty of not less than 125,000,000 per 1000 pounds of dry steam.

The design of the engine embodies some special features regarded by the designer and builder as important, and as contributing effectively to the attainment of this exceptional economy. According to the statement given by Irving Reynolds, to whom the writer is indebted for many facts of interest and useful information, the designer was guided to a certain extent by these considerations:

"Starting with the proposition that an outside packed plunger pump is the simplest, and under most conditions the best form of pump, the next step is to use the least number that will give a uniform flow of water—viz., three, set at equal angles (120°). Having three plungers, they can as well be single as double acting, as the flow of water is practically constant and the single acting is much the simpler form of pump."

The Milwaukee engine was designed by Irving Reynolds, under the general supervision of the superintendent of the Allis Works, Edwin Reynolds.

The engine is of the vertical triple expansion type, with steam cylinders and parts above the bed plate arranged somewhat similar to those of the modern marine engine. The capacity of the engine is 18,000,000 gallons in 24 hours, raised 160 feet, and the speed is 20 revolutions per minute, or 200 feet piston speed. The cylinders are three in number, one high pressure, 28 inches diameter, one intermediate, 48 inches, and one low pressure, 74 inches diameter, all having a stroke of 60 inches. The cylinders are mounted on cast iron A-frames, which rest on heavy bed plates carrying the main shaft journals. The cylinders are steam jacketed, having the working barrels inserted as separate pieces. The steam and exhaust valves are located in the cylinder heads, their chests thus jacketing the latter.

The pumps are entirely below the floor. The fly wheels perform the office simply of aiding in the regulation of the engine. Between each two cylinders is a receiver, heated by high pressure steam. The volumes are, respectively, high pressure, 101.3 cubic feet, intermediate, 151 cubic feet. In the high pressure and intermediate cylinders the jackets are supplied with live steam at boiler pressure; but on the low pressure cylinder the jacket is supplied with steam which passes through a reducing valve, and which has a constant pressure of 34 pounds. The steam is supplied to the high pressure jacket by a pipe leading directly from the main steam pipe; the exhaust from this jacket supplies the jacket of the intermediate cylinder, and this is led into a trap, the overflow of which ordinarily passes into the suction of the feed pump for supplying the boilers. The exhaust steam from the low pressure cylinder jacket is similarly received into a steam trap and discharged into a feed pipe.

The exhaust valves of the low pressure cylinders, when closed, are flush on

the inside of the cylinder head, thus eliminating clearance due to exhaust ports. All the valve ports are located in the cylinder heads.

The valve gear is of the Corliss type on the high and intermediate cylinders, and a combination of Corliss steam valves and poppet exhaust valves on the low pressure cylinder. The clearances in the cylinders and ports are: High pressure, $1\frac{1}{4}$ per cent.; intermediate pressure, $1\frac{1}{10}$ per cent.; low pressure, $\frac{1}{10}$ of 1 per cent.

The cut offs of the high pressure cylinder are under the control of a speed governor combined with an adjustable hand cut off. The cut offs of the intermediate and low pressure are controlled by a hand gear only, the point of cut off in these cylinders being set usually in the inverse ratio of the cylinder volumes. Each steam piston has two rods connecting to a forged steel cross head; from this cross head extend four tie rods to the head of the pump plunger, thus transmitting the motion direct from the steam pistons to the pump plungers, without passing through links or beams of any kind, making the machine direct acting in the best sense of the term.

The upper ends of the connecting rods take hold of the cross head in the space between the two piston rods, the lower end connecting to its crank pin. There are three cranks set at angles of 120°, and the motion of each pump plunger being controlled by its own crank, tends to secure uniform flow of water through the pumps.

The center crank—intermediate—is considerably larger than the others, and is fitted with drag boxes, to prevent the breaking of the shaft in case it gets out of alignment. There are two fly wheels, 20 feet diameter and weighing 50,000 pounds each.

The pumps deliver only on the down stroke, but the plungers are balanced to one-half the head, so that the work in the steam cylinders is uniform on both the up and down strokes, and the only load passing through the crank shaft is that which is given to and taken from the fly wheels, at the beginning and end of each stroke.

The pumps are three in number, one located beneath each engine. The plungers (32-inches diameter) are of the single acting outside packed plunger type, each plunger being driven from a cross head. The valve chambers are cylindrical, and extend above the discharge valves, forming air chambers, on which rest one end of the engine bed plates, this latter arrangement saving foundations, and at the same time rendering the pumps easily accessible. The pump valves are rubber, of small diameter ($3\frac{1}{2}$ inches), and are mounted in groups of 28 on "cages." There are seven of these cages (196 valves) in the suction and discharge of each pump, with an area about equal to that of the plunger.

The engine is fitted with a surface condenser, the air, feed and circulating pumps being driven by an arm extended from the low pressure plunger. The air pump is 22 inches diameter by 60 inches stroke and is single acting.

Steam is supplied by a battery of five horizontal tubular externally fired boilers, with ordinary brick setting.

The 12,000,000 compound, put in in 1881, cost \$65,000 with boilers, or \$5400 per 1,000,000 gallons; the guaranteed duty being 97,000,000 foot pounds. In 1890 the triple expansion engine was put in for \$76,000, including boilers, or \$4400 per 1,000,000 gallons, or ex-

clusive of the boilers, \$66,000, equal to \$3666 per 1,000,000 gallons capacity.

Thus the 18,000,000 engine of 1893 cost practically the same as the 12,000,000 of 1881, with 29 per cent. better guaranteed duty; and the compound 16,000,000 engine of 1873 cost more than twice as much, with one-half the guaranteed duty of the 18,000,000 triple expansion of 1893. These figures are the more interesting from the fact that all three of these engines are by the same builders.

Cost of Pumping 1,000,000 Gallons for the Year 1892.

	100 ft. high.	1 ft. high.
Cost, including fuel, labor, repairs, interest and depreciation.....	\$7.34	4 58-100 cts.
Cost as above, but exclusive of interest and depreciation.....	5.40	3 37-100 cts.
Cost per 1,000,000 gallons, for coal only.....	3.15	1 96-100 cts.

The figures are for all coal burned, for all purposes, during the year, including starting and banking fires, heating the building, furnishing steam to a small engine which is in constant operation during the day driving the water works machine shop, and at night driving a dynamo, lighting the building.

The preparations for and method of test were as nearly as practicable in accordance with the plan indorsed by a committee of the American Society of Mechanical Engineers, and as follows:

Indicator diagrams were taken every fifteen minutes. Temperatures of feed water, discharge jacket water, external air, engine room, and flue gases were taken. The total consumption of water is obtained by measurement of the feed water supplied the boilers. This was taken from the hot well of another engine, and the condensed steam from the engine under test was, during the trial, discharged from the overflow and wasted. The steam used to supply the jacket was measured by receiving the overflow from the jacket traps into weighing tank No. 3, and was returned to the boilers as a portion of the feed water.

During the test two observers, one of whom was supplied by the builders of the engine, the other by the party from Cornell University, kept independent logs of the water supplied to the boilers.

The following table gives some of the results of the test:

<i>Fuel.</i>	
Total coal consumed, pounds.....	18,234
Moisture in coal, per cent.....	5.25
Dry coal consumed.....	17,277
Total ash, dry, pounds.....	255
Total ash, dry, per cent. of dry coal.....	1.47
Moisture and ash, per cent. of wet coal.....	6.65
Total combustible, pounds.....	17,022

<i>Feed Water.</i>	
Total weight of water used, pounds.....	162,864
Excess of water in boiler at end of run, pounds.....	151
Total evaporated dry steam, pounds.....	161,023.2
Factor of evaporation (equivalent value of 1 pound wet steam to 1 pound dry steam from and at 212° F.).....	1.154
Total equivalent evaporation from and at 212° F., pounds.....	187,794

<i>Evaporation per Pound of Coal, Pounds.</i>	
* Apparent: feed water, 97°; steam, 131.4.....	8.906
† Actual, to dry steam.....	8.81
Equivalent from and at 212°.....	10.27

* Uncorrected for calorimeter.
† Corrected for calorimeter.

Frederick A. Schaffler of New York described a

Curve Delineator,

by means of which arcs or circles 50 feet radius to 1000 feet or more could

be drawn. In a few seconds the adjustment of the instrument can be set at such an angle that it would describe an arc of a circle anywhere from 3 feet radius to infinity, and a straight line may be drawn with it. The design of the instrument consists of simply two straight edges, joined at a common center, with a simple device for changing the angle of the straight edges in relation to each other; the device also carrying an attachment for adjusting and fixing a pen or pencil to bear upon the drawing paper at the point of juncture of the two straight edges. The use of the instrument is based upon the fact that the versed sine of any particular chord is always constant if the radius is constant. To use the instrument, two pins are required to be placed at the extremities of the chord selected, for the points through which the arc is to pass. A table is given with the paper, giving the requisite angles to set the instrument at, with the fixed chord of 24 inches and for any radii between 2 feet and 300 feet.

The report of the

Committee on Gauges

stated that they had carefully considered the matter referred to them and "they recommend that the thickness and diameter of pieces to be measured shall be expressed in decimals, which would imply the use of the micrometer screw gauge. The committee is divided in its opinion as to whether the decimal should be thousandths of an inch or hundredths of a millimeter." The committee are of opinion that all the engineering and scientific societies of this country will join this society if they adopt a decimal gauge. The committee was continued with power to act and will confer with European societies in the endeavor to obtain an international system.

Secretary Herbert on Tuesday awarded the contract for building the three new gunboats authorized by the last Congress to the Newport News Dry Dock & Shipbuilding Company, at their bid of \$280,000 for each vessel. Two of these gunboats will be of an entirely new type. They are designed for navigation of shallow streams, particularly on the China station, and are required to develop a speed of 14 knots an hour. The third vessel will be of heavier draft, and is intended for service in the tropics, 13 knots being the required speed. The contract calls for their completion within two years. The bid of the Newport News Company was nearly one-third less than that of the other competing firms.

At the opening of the bids on Tuesday at the War Department for the supply of 10,000 pounds of smokeless powder for the use of the army four tenders were recorded—namely, from the Pneumatic Torpedo & Construction Company of New York, for a powder containing 60 per cent. of nitro-glycerine, 70 cents per pound; no nitro-glycerine, 80 cents per pound; Herman Waltorck of Newark, N. J., \$2.20 per pound, and for 10,000 pounds additional \$2 per pound; Bernard Peyton, Santa Cruz, Cal., \$1.25 per pound; Leonard Smokeless Powder Company, New York, 75 cents per pound, in lots (the price to be graded by initial velocity, 50 cents per pound for a velocity of 1960 feet, to be increased 1 cent per pound for each additional 10 feet of velocity per second).

Washington News.

(From our Special Correspondent.)

WASHINGTON, D. C., December 5, 1893.

The special plea made in behalf of the tariff revision bill by the President in his annual message to Congress places that measure before the majority in both the House and Senate as distinctively under the patronage and support of the Administration. In that character, even if there should be any doubts in the minds of any member of either House as to its expediency, it will be expected that every member of the majority will give it his vote.

The general tenor of this part of the message, however, has not been of a tone calculated to stiffen that class of Representatives and Senators who are greatly perplexed as to which shall hold the prior and paramount claim, the interests of their constituents, which they are supposed to protect, or the demands of their party on a general line of public policy.

In the comments of the President's friends, who are inclined to read the measure between the lines, they think that they discover in it a degree of timidity and hesitancy which has not heretofore been characteristic of its author. They say that the appalling magnitude of the partisan majorities in the great States of New York, Massachusetts, New Jersey, Pennsylvania and Ohio, not to speak of the lining up of the less important States of Nebraska and Montana, hitherto supposed to have drifted from their party moorings, whether caused by local issues or public uneasiness, must have raised an ill disguised doubt.

In the first flush of the late elections, when the managers of the tariff revision were in a very panicky condition, the President renewed their courage by declaring that no step backward must be taken; but subsequent developments in the general disturbance of business and industry, and the enforced idleness of masses of wage workers all over the country, have made a deeper impression than the ballots of last November.

The moderate tone of the Presidential message on the subject does not, however, modify his personal interest in the prompt passage of the bill in the exact form in which it was made public by the Chairman of the Committee on Ways and Means.

It was very soon evident that the Administration would do its share in strengthening it among the men who would have in their hands the part of its adoption at the Capitol. The word was passed around and every member of the Cabinet took every opportunity to give the bill a good word when Senators and Representatives called at the Departments on other business.

A few days ago Senator Faulkner called at the Post Office Department. The big bodied good natured chief impatiently disposed of the Senator's business and then put the question flatly: "Senator, what do you think of the new tariff bill?" "I would like it better if it made coal 45 cents a ton instead of 75 cents, as now, or free, as proposed to be."

"You are now aiming at Nova Scotia coal. Now, let me tell you that that coal is of a very inferior quality, and I do not think would be a factor against our American coal. For all purposes American coal is infinitely superior to Nova Scotia."

The Senator replied: "If that be so I can support the whole bill."

The Kentuckians are complaining that the bill will sadly affect three of the staple industries of their State—flax, coal and iron ore. In Michigan iron ore, salt and lumber. In Virginia coal, iron ore and iron. Not to mention the injury to the diversified and enormous industrial interests of States like New York, Pennsylvania, New Jersey and Ohio.

A consensus of opinion, however, among the majority in both Houses indicates that the bill will pass by a full party vote. As yet none have declared a determination to vote against the bill, and a very large number have signified their purpose to vote for it.

As yet no formal canvass has been made, but it is accepted by the President, Secretary Carlisle and Chairman Wilson that the bill will pass.

It is now possible that the bill will not more than get under way by the time of the Christmas holiday, on account of the delay in determining the sources of taxation from which the loss of \$43,000,000 from articles placed on the free list and the existing deficiencies of \$50,000,000 in the Treasury shall be made up.

Allowing the ten days to be accorded the minority for the preparation of their report, the bill could not, at the closest calculation, get into the House before the 15th. The Republican leaders were in conference to-day and decided upon their course.

It was conceded among them that the bill would pass when it reached a vote. That in the House, under the parliamentary methods of that body, it could be carried through in a very brief space of time.

Therefore it became a question whether it would not be the better policy for them to pursue to simply make a few speeches in support of the minority report, thus placing themselves as a party on record for campaign purposes, and then let the vote be taken, thus avoiding a protraction of the present industrial prostration and uncertainty.

In the Senate the bill has been talked over by the minority of that body in the same line. The members of the majority who were expected to eliminate some of the worst features of the bill have been ominously quiet. The conclusion reached is that not a single one of them will be found voting against the measure on its passage.

The Senators of the minority would have it in their power to indefinitely protract the discussion of this measure in their body. They have agreed, however, with their friends in the House that the interests of business and industry demand that the question should be settled promptly so that the industries affected may know what to expect and can make their plans accordingly. From an industrial point of view they also propose to act on suggestions from the manufacturers that if the bill is certain to pass in the shape in which reported then the quicker the better, so that they can make their arrangements to meet the production required for, next year's demand, taking into account the competition of the foreign importations in the same line.

Therefore in the Senate the minority simply propose to speak a reasonable time against the bill and its underlying policy and then let the vote be taken.

There are some who think that the tariff bill as it now stands before the country will become a law before February 1.

MANUFACTURING.

Iron and Steel.

The stock in the Andrews Brothers Company, operating the Haselton Rolling Mills, at Haselton, Ohio, owned by the late James Neilson, has been purchased by John A. Logan, Jr. The annual meeting of the stockholders of the Andrews Brothers Company will be held in Haselton in January next.

In the United States Circuit Court in Pittsburgh last week, arguments were heard on a motion for an injunction by H. W. Oliver, receiver for the Oliver Iron & Steel Company, against Anderson, Du Puy & Co., steel manufacturers, of that city. The allegations are that certain stock of a natural gas line held in common by both companies was attached as collateral for a note given by the Oliver Company to Anderson, Du Puy & Co. When the note matured the holders sold the collateral at an inadequate price. Mr. Oliver claims an unfair advantage was taken of his company, and he now seeks to restrain the defendants from shutting off the gas supply to the Oliver mills.

Wallace, Banfield & Co., operating the Irondale Rolling Mills, at Irondale, Ohio, have placed an order with the Ellwood Iron Works of Ellwood, Ind., for two additional tinning pots and also two additional cleaning machines. When the erection of these has been completed the tinning department of the above plant will consist of six Morewood, two Thomas & White and two Ellwood tinning machines. The addition of these two tinning machines will increase the tinning capacity of the plant about 25 per cent., and it is the intention of the firm in the future to tin their entire output of black sheets.

The Alabama Rolling Mill Company of Birmingham, Ala., will resume in all departments double turn on Monday, December 11. Improvements have just been completed which will give the mill an output of from 2000 to 2200 tons of finished iron per month.

The closing of navigation has caused a demand for bar iron sufficient to justify the Duluth Mfg. Company of Duluth, Minn., in starting a portion of their rolling mill. The plant has not started in full, but one mill will run at a time, alternate days.

The Reeves Iron Company, Canal Dover, Ohio, are running their large plant to its full capacity, having a fair demand for their bar iron and galvanized sheets.

Shipments of armor plate for the new gunboats "Monadnock," "Terror" and "Oregon" are now being made by the Homestead Steel Works, at Homestead, Pa. Shipments of armor plate from the above plant during October amounted to about 275 tons. Wages of laborers employed at the Homestead Steel Works have been reduced from \$1.40 to \$1.20 per day of ten hours.

About 1200 employees of the Cambria Iron Company, at Johnstown, Pa., in the mechanical department have agreed to accept a reduction of 10 per cent. in wages, with the expectation that the firm will be able to secure sufficient orders to keep in full operation, or nearly so, during the winter months.

Macungie Furnace, at Macungie, Pa., operated under lease by the Crane Iron Company, was banked down last week on account of the strike of the employees of the Lehigh Valley Railroad.

The Carrie Furnace Company of Pittsburgh, operating the Carrie Furnaces, at Rankin, Pa., have placed an order with the Crane Elevator Company of Chicago for a large furnace hoist, which will be built at the above furnaces. The hoist will have a lifting capacity of 6000 to 9000 pounds.

The blast furnace of the Raney & Berger Iron Company, at New Castle, Pa., which has been idle for some time, has again resumed operations.

Furnace D of the Edgar Thomson plant, at Bessemer, Pa., was badly wrecked by an explosion last week. A mass of iron and cinder containing many tons, which had been hanging in the furnace for some time, fell, causing the explosion. The furnace is now undergoing necessary repairs.

At the Sligo Rolling Mills of Philips, Nimmick & Co., Pittsburgh, the puddling department is occasionally operated three turns per day of eight hours each. It will be remembered that the refusal of the

Amalgamated Association to allow this to be done at the Elba Iron Works Department of the Oil Well Supply Company in Pittsburgh was the cause of the strike at that plant last year.

The New Philadelphia Iron & Steel Company, New Philadelphia, Ohio, have been running three sheet mills for a few weeks past and will at once put others into operation.

On December 15 next application will be made for a charter of incorporation by the H. W. Minnemeyer Mfg. Company of Pittsburgh. The incorporators are Christian E. Wolff, Paul C. Wolff, Henry W. Minnemeyer, Henry W. Minnemeyer, Jr., and Charles E. Minnemeyer. The new concern propose to engage in the manufacture of iron and steel.

The plant of the Coleman-Shields Company of Niles, Ohio, is in operation to nearly full capacity, giving employment to about 250 men.

At Cleveland last week an appeal was made to the courts for the adjustment of the claims and suits of the partners who formerly composed the firm of Cleveland, Brown & Co. Captain Frank Wilson commenced suit against Peter M. Hitchcock, A. M. Wilcox and Richard Brown. In his petition he avers that the four persons mentioned were associated in business on July 1, 1885, with a capital stock of \$406,180. The real estate and certain other property of the concern was, he says, inventoried at \$106,000. He alleges that in the following year the books were made to place the same property at a value of \$60,000, and that a loss of \$39,508 was announced, whereas a profit of \$16,491.29 was made. The petition contains various other statements and allegations concerning the business of the firm prior to the dissolution of the partnership on February 1, 1891. Captain Wilson is not satisfied with the conduct of affairs, and claims that he has not received his due portion of the assets and profits. He therefore asks for an accounting at the hands of the court.

The following departments of the plant of the Brown-Bonnell Iron Company, at Youngstown, Ohio, resumed operations this week: The two 10-inch mills, hoop mill, 12-inch mill, 8-inch mill, sheet mill and Nos. 1, 3 and 4 bar mill and the Williams bar mill.

Nearly all departments of the plant of the Andrews Brothers Company, at Haselton, Ohio, are now in full operation. At the plant of the Mahoning Valley Iron Company, also at Youngstown, nearly every department is on in full.

It is reported that the sheet mills of the Britton Iron & Steel Company, known as the Lake Shore Mills, at Cleveland, Ohio, will be put in operation at once. It is intended to run the mills non-union.

A recent issue of the *Inland Ocean*, published at Superior, Wis., says: "There is but little doubt that the plant of the West Superior Iron & Steel Company will pass into the hands of the Rockefellers, although it may not be put in operation much before spring. John D. Rockefeller has for the past two weeks been dealing directly with Warner Van Norden, president of the land company, for the purchase of the plant. For several months past the Rockefellers have been increasing their holdings in the American Steel Barge Works, and will probably conduct the steel plant in connection with the barge works. It is also reported that they have opened negotiations with a view to securing the York charcoal iron furnaces, on which construction was stopped some time ago owing to the sudden collapse in health of President Gale of Minneapolis. The details of the deal are understood to be: The bondholders of the steel company, chiefly the Rockefellers, will take hold of the plant if the land company will assume the indebtedness, which, aside from the amount owing the land company, is less than \$200,000. On the other hand, the Rockefellers agree to take the plant, operate it and put at least \$2,000,000 in improvements, making the plant second to none in the country. Should the deal go through, and there now seems but little doubt that it will, work will be commenced this winter on the proposed improvements."

The sudden rise in the Ohio River last week will prove to be a blessing to the cut nail manufacturers in the Wheeling district. As is well known, a large part of the demand for cut nails comes from the South, and shipments to Southern points are nearly always made by river. Owing to the low stage of water in the Ohio River for a num-

ber of months very few shipments have been made. Now that a navigable stage of water has come, it is expected that large shipments of cut nails will be made by the various concerns located in Wheeling and other points in the Ohio Valley.

The cut nail factory and plate mill of the La Belle Iron Works, at Wheeling, W. Va., were in full operation last week.

A number of additional sheet mills of the Aetna-Standard Iron & Steel Company, Bridgeport, Ohio, were started up last week.

The galvanizing department of the plant of the Whitaker Iron Company, at Wheeling, W. Va., which was not destroyed by the recent fire, is in full operation. As soon as the insurance on the destroyed buildings of this firm has been adjusted they will be rebuilt on a larger scale than before.

We are advised that the report that a boiler of the Climax type, in the plant of the Riverside Iron Works, at Wheeling, W. Va., exploded recently, is without foundation. There have been no boiler explosions at any of the works of the above firm for some years.

Some excellent records for production have recently been made at the Bessemer steel plant of the Shenango Valley Steel Company, at New Castle, Pa. On Tuesday of week before last the night turn made 350 tons of billets, while the output for the entire 24 hours was 641 tons.

The sheet mill department of the works of the Moorhead-McCleane Company, at Pittsburgh, which has been idle for some time, will resume operations within a few days, as a result of the agreement reached between the sheet manufacturers and the Amalgamated Association.

The Mahoning Valley Iron Company, Youngstown, Ohio, have started up their bar and guide mills, their blast furnace, plate mill and spike factory remaining idle. On account of the unsatisfactory outlook for any improvement in business before spring it is possible that the idle departments of this plant will not be started up for some time.

The mills of the Akron Iron Company, at Akron, Ohio, are running only one or two days per week to fill accumulated orders. This firm have not puddled any pig iron since June 24 last, and the prospects for the starting up of their boiling department in the near future are not encouraging.

Nearly every department of the Homestead Steel Works, Homestead, Pa., is in operation this week. The 119-inch plate mill was put on triple turn last week for the first time in some months. With the exception of the 32-inch mill and the converting mill all other departments of this plant are on double turn.

In one day recently there were turned out in the wire nail department of the HP Nail Company, at Cleveland, Ohio, 5652 kegs of wire nails. This is claimed to be the largest day's record ever made in wire nail production in one establishment.

The sheet rollers and other tonnage men of the Newport Iron & Steel Company's works, at Newport, Ky., went out on strike last week for the alleged reason that they claimed that the general reduction of 10 per cent. in sheet mill wages did not apply to them. About 24 men went out and 300 were compelled to follow. The matter has since been satisfactorily adjusted.

All non-union sheet mills have followed the action of other mills by reducing tonnage wages 10 per cent. W. Dewees Wood Company of McKeesport are among the number.

A press report states that the National Tube Works Company, McKeesport, Pa., have asked their puddlers to work for \$4 per ton, on the understanding that no more steel is to be used. There must be a serious mistake in this report, as it is hardly probable that the above named company can afford to allow their Bessemer steel plant to remain idle for such a consideration. This plant was recently completed and described in *The Iron Age*, November 16.

Van Alen & Co.'s rolling mill and nail factory, at Northumberland, Pa., are now running on double time, employing 300 men.

Phoenix Furnace, owned by the Brown-Bonnell Iron Company, Youngstown, Ohio, will resume operations in about a week. The stack is now banked.

Emma Furnace, Union Rolling Mill Company, Cleveland, is now in blast.

Spearman Furnace, at Sharpsville, Pa., has resumed blast.

Rosena Furnace, at New Castle, Pa., which started November 12, is now running satisfactorily, having made 275 tons of No. 1 iron in one day recently. E. D. Reis, superintendent, has resigned his position as manager at Edith Furnace, Allegheny, Pa., in order to devote all his time to Rosena.

Middletown, Ind., is to have a rolling mill, but it will not be the Irondale Mill of Anderson, to which the former city had been holding out inducements ever since the mill was burned. It is stated that a contract has been signed with a new company, which provided that work shall begin on the building on or before January 10 next, and that the plant shall be in operation, employing 400 men, July 1, 1894. The subsidy is \$40,000 in cash.

A bill has been filed in the federal court of Chattanooga, Tenn., seeking to set aside the recent action of the United States Circuit Court at Louisville, Ky., in placing the Malleable Iron Works of Chattanooga in the hands of receivers. The complainants seek the relief on the grounds that the representations made were fraudulent and collusive, and that the stockholders had no notice of such intended action.

At Duluth, Minn., the West Duluth Mfg. Company and the Duluth Mfg. Company have resumed operations. The York Iron Company, at Black River Falls, Wis., have also started up.

The employees of the rolling mill and tube works of the Reading Iron Company, Reading, Pa., have accepted a reduction of 10 per cent. in wages.

There is a probability that the Bristol Furnace, at Bristol, Va., will be leased. A proposition is said to have been made to the owners, which, if accepted, will insure the starting of the furnace by January 1.

It is stated that the Low Moor Iron Company of Virginia are preparing to start their furnace at Low Moor.

The furnace of the Cherry Valley Iron Company, at Leetonia, Ohio, which has been rebuilding for some time, has been completed and blown in after an idleness of four months.

At the Albany Iron Works, Troy, N. Y., last week the hammers at the water mill were in operation.

At the Burden Iron Works, Troy, N. Y., the winter schedule has gone into effect, and the puddling furnaces now light up Sunday nights instead of Monday.

The Bethlehem Iron Company, Bethlehem, Pa., shipped last week 132 tons of Harveyized armor for the battle ship "Maine."

It is announced that Belmont Furnace, at Wheeling, W. Va., has been prepared for an early resumption.

The Lehigh Iron Company of Allentown, Pa., have announced a reduction in wages of 10 per cent.

The Blandon Rolling Mill Company, Reading, Pa., have reduced the wages of their puddlers from \$3.25 to \$3 per ton.

The Elk Rapids Iron Company of Antrim, Mich., have steadily operated their blast furnace, saw mill, grist mill, &c., despite dull times and reduced demand.

The rolling mill at Laramie, Wyoming, is now in operation. The mill has recently been greatly improved. A puddling department has been added for the purpose of making a higher grade of bar iron. The prospects are reported good for a full winter's run.

The Ironton Structural Steel Company of Duluth, Minn., are reported by Duluth papers to have started up their works the past week. It is understood that the company have secured the contract for furnishing building plates, beams, &c., for the new building to replace the Fergusson Block and that sufficient work will probably be secured from other sources to keep the new works busy during the winter.

The rolling mill at the Duluth Car Works was put in operation on the 27th ult.

The unsecured creditors of the Pennsylvania Steel Company held a meeting at Philadelphia last week and authorized the appointment of a committee of seven gentlemen to confer with N. Parker Shortridge, J. L. Erringer, Henry N. Paul, Edmund Lewis and Joseph M. Shoemaker, a committee of the stockholders, in regard to the reorganization of the company. C. Stuart Patterson, chairman of the meeting, will appoint the committee, of which three are to be chosen at large and one each is to

represent Boston, New York, Philadelphia and Baltimore.

The Detroit Bridge & Iron Works, at Detroit, Mich., are increasing their capital stock to \$300,000.

It is stated that a radical change will soon be made in the method of making rails at the Edgar Thomson Steel Works, Bessemer, Pa. It is understood that the direct process in operation at this plant for some time is to be discarded, and the same method in vogue during the time when Capt W. R. Jones was superintendent of the plant will again be adopted. If carried out this will necessitate the erection of new heating furnaces, giving employment to a large number of men, whose services were dispensed with about a year ago.

Additional departments of the plant of the Cleveland Rolling Mill Company, at Cleveland, Ohio, which have been idle since last July, will be put in operation during this week, giving employment to about 300 men.

We are advised that there is "not a shadow of truth" in the statement that A. French and John M. Patterson of the A. French Spring Company, at Pittsburgh, would establish a large iron plant at Raleigh, N. C. The report stated that the new plant would manufacture car springs for the Pullman Palace Car Company.

The plant of the Falcon Iron & Nail Company, at Niles, Ohio, has been in operation only about half time for some months past. Unless there is a large increase in orders in the near future, the firm do not expect to be able to operate to even half capacity.

The blast furnace of the Bellaire Nail Works, at Bellaire, Ohio, went in operation on November 23, after an idleness of about three months. The Bessemer steel plant of this concern has been in operation from one-half to two-thirds time since last August. Their sheet bar mill has also been in operation part of the time, running only when sufficient orders were received to justify putting it in operation. For the balance of this year the firm expect to operate their different departments as they have been doing for the past three or four months. It is the intention to keep their blast furnace in continuous operation.

The Tudor Iron Works, East St. Louis, Ill., have closed down in part on account of a decrease in the number of orders received.

The Pottsville Iron & Steel Company, Pottsville, Pa., have started up their fish-back mill after an idleness of a week and a partial idleness of three days a week for the past four months.

Machinery.

The Richmond Locomotive & Machine Works, Richmond, Va., have secured an order for the building of 20 new engines for the Atchison, Topeka & Santa Fé Railroad, and are rebuilding ten engines for the Peoria & Eastern Railroad.

Another decision has been handed down in the United States Circuit Court in New York City sustaining the patents of the Westinghouse Air Brake Company of Pittsburgh. This last decision denies the motion of the defendants, the New York Air Brake Company, for leave to sell, subject to a royalty, 3000 sets of infringing air brakes, which they claim to have on hand, and making the injunction in favor of the Westinghouse Air Brake Company absolute. Officials of the New York Air Brake Company say they will take an appeal, and if they succeed in reversing the judgment their works at Watertown, N. Y., which have been closed by the injunction, may be started up again.

The Spicer Mfg. Company, New Philadelphia, Ohio, have recently equipped the new plant of the New Castle Steel & Tin Plate Company, New Castle, Pa., with their sheet metal trucks.

The Michigan Peninsular Car Company, who paid a dividend on the common stock last spring, have recently passed the dividend on the preferred stock.

The new plant of the Woonsocket, R. I., Electric Machinery & Power Company is about completed and will be in operation shortly. Water is the motive power for driving the dynamos, two pairs of 36-inch turbines, developing 600 horse-power, being used. Three generators, each of 150 horse-power, will be installed.

Thirty-five employees of the Warren Foundry & Machine Works, Phillipsburg, N. J., have struck because of a system adopted by the company which the men claim

greatly increases their hours of labor per day without increasing their pay. By the new order the men are compelled, to do about 12½ hours' work in ten hours' time. A hundred men are out of work by reason of the strike. The company claim that the new arrangement was made necessary in order to compete with the cheap labor of the South.

The Donaldson Iron Company, pipe manufacturers at Emaus, Pa., announce a reduction of 10 per cent. in wages, affecting all men except laborers, who get 90 cents a day.

Notwithstanding the general depression in the foundry trade the Danville Foundry & Machine Company of Danville, Ill., find themselves obliged to enlarge their plant. They are just finishing a large addition to their foundry, and are equipping it with the Ridgway steam-hydraulic cranes, and one of the Ridgway steam-hydraulic elevators is used for taking the stock up to the cupola platform. Before deciding upon the crane for the new works, the Danville works about a year ago ordered a small Ridgway crane for their old works.

W. A. Blakeslee, proprietor of the Blakeslee Foundry, in Allentown, Pa., who recently failed has issued a statement, in which his liabilities are given at \$27,340, and the assets at \$37,036, of which amount \$35,000 is alleged to be real estate, buildings, machinery, patterns, tools, &c.

The King Press Drill Company are erecting a foundry at Hebron, Iowa, to manufacture drills.

The Tyler Foundry & Machine Company have been chartered at Fort Worth, Texas; stock, \$30,000. Incorporators, A. L. Clark, J. F. Christian, John A. Bonner, J. F. Patterson and I. Cahen, all of Tyler.

The Winkler Machine Mfg. Company have been organized at Kansas City, Mo., with a capital of \$40,000.

A new boiler works is to be built at Escanaba, Mich.

The Wilmot & Hobbs Mfg. Company, Bridgeport, Conn., are running their hot rolling mill, plating, grinding, buffing, soldering and tool making departments full time, and the cold rolling mill 48 hours per week, with a prospect of the latter department also being run full time.

The Chas. Berghoefer & Lupinski Company, millwrights and machinists, at Milwaukee, Wis., have made a voluntary assignment. The assets of the company are in the neighborhood of \$58,000, while the liabilities, it is said, will not amount to more than \$33,000. The cause of the failure was the inability of the firm to get ready money with which to meet the claims of pressing creditors.

It is reported that a stock company, composed of Oshkosh, Wis., capitalists, will be formed to operate the Northwestern Car & Machine Company's plant, for which a receiver was recently appointed.

The new plant of Reeves Brothers, boiler manufacturers, at Alliance, Ohio, has not been fully completed, but has been put in partial operation. The erection of the second building, which will be equal in size to the main building, has been postponed until spring.

The American Road Machine Works of Kennett Square, Pa., which have been idle for some time, have started up with a full force.

The New Iberia Foundry, recently burned at New Iberia, La., will be rebuilt on a more extensive scale.

The wages of the employees of the Portsmouth Machine Company, Portsmouth, N. H., have been reduced 10 per cent.

The Piqua Boiler Works, Piqua, Ohio, have gone into the hands of a receiver upon the application of the Third National Bank, which is the largest creditor.

Some weeks ago we published an item stating that the large new foundry being built by the J. I. Case Mfg. Company, at Racine, Wis., would be equipped with electric cranes. We have since learned that electricity will not be used at all for the cranes. The cranes that have been adopted are the Ridgway steam-hydraulic. Quite a large number of them will be used, and the order for same has been placed. For the lighter work direct acting air hoists will be used of 1-ton capacity. These latter, as well as the steam-hydraulic cranes, will be furnished by Ridgway & Son of Coatsville, Pa.

The Fischer Foundry & Machine Company of South Side, Pittsburgh, have re-

cently done a large amount of repair work at the Wheeling Steel Works of the Wheeling Steel & Iron Company, at Wheeling, W. Va.

The Montague Iron Works, at Grand Rapids, Mich., have resumed with a full force of men

The Columbiana Pump & Machine Works, Columbiana, Ohio, have started up after a shut down of one month.

The machine shops of the Pennsylvania Railroad located at Altoona, Pa., which for the past three months have been working only five days a week and nine hours per day, have gone on full time and in the future will work ten hours per day and six days per week.

Plans for the new works to be erected by the Westinghouse Electric & Mfg. Company, at Brinton, Pa., on the line of the Pennsylvania Railroad, about 12 miles from Pittsburgh, were on exhibition in the Westinghouse Building, Pittsburgh, last week. As already stated in these columns, it is the intention of the company to concentrate the various Westinghouse interests at Brinton when these buildings have been completed. Bids for a machine shop 754 x 231 feet and a warehouse 754 feet long and 76 wide are asked for. The contracts for these two buildings will be closed December 16. The other buildings, which will be built later, are a foundry, 700 x 150 feet; a punch department, 250 x 76; a carpenter shop, 300 x 75; a paint shop, 100 x 50, and a power house, 76 feet wide and 300 feet long. All of these buildings will be two stories high. A three story office building, 200 x 50 feet, is also to be built, but the plans for it have not yet been completed. Railroad tracks will extend along the side of the warehouse, and an elevated track will also extend the entire length of the building, from which material can be loaded or unloaded into the second story. Five bridges will connect the second story of the machine shop and warehouse. A dozen traveling electric cranes will be used in handling the heavy castings. The plans were designed by Thomas Rodd and drawn by W. A. Hawley. The estimated cost of the machine shop and warehouse buildings is over \$500,000.

Among the recent sales of the National heater, manufactured by the National Pipe Bending Company of New Haven, Conn., are one of 2000 horse-power to the American Linen Company, Fall River, Mass.; 800 horse-power to Harris Woolen Mills, Woonsocket, R. I.; 1000 horse-power to Union Street Railway Company, New Bedford, Mass., and 2000 horse-power to the Electric Light & Power Company, Syracuse, N. Y.; 500 horse-power to Boston Rubber Shoe Company; 300 horse-power to Edison Electric Company, Tamaqua, Pa.; 300 horse-power to Meriden Street Railway Company; 500 horse-power to Portland, Ore.; 200 horse-power to Valdosta, Ga.; 1000 horse-power to Jersey City & Bergen Street Railway Company; 600 horse-power to Halifax Electric Company, Halifax, Nova Scotia; 500 horse-power to Brooklyn Heights Railroad Company, Brooklyn, N. Y., and many others of smaller sizes.

The Huyett & Smith Mfg. Company, makers of heating and ventilating apparatus, Detroit, Mich., report a material improvement in their business. For the last three weeks their works have been running on full time in every department and the company are even behind with their orders. The prospects for a good winter trade are very promising.

The Winkler Machine Mfg. Company, capitalized at \$50,000, have filed articles of incorporation at Kansas City, Mo. The company have been formed for the purpose of manufacturing the Winkler ice machines, the Winkler hose coupler, the multiple piston engines and other machinery in Kansas City. The incorporators are Ehrgott T. Winkler, Theodore Stegner and Frank W. McMillan, all of Kansas City.

At the Pullman repair shops at Wilmington, Del., 300 men have resumed work in addition to a like number already employed. A cut of 20 per cent. was announced, but after the first of the new year the men will work on piece work, so that the reduction is only temporary.

The New York Locomotive Machine Works of Rome, N. Y., have been destroyed by fire. The property was valued at \$500,000, and was insured for about \$300,000. The fire is thought to have been of incendiary origin.

Hardware.

The Southington Cutlery Company, Southington, Conn., are now running eight and one-half hours a day.

The Winchester Repeating Arms Company, New Haven, Conn., are running on full time and in some departments are working overtime. This is owing to the manufacture of arms for use in the troubles in Africa and Brazil, and the plant will have all the work it can handle for some time to come.

The Bridgeport Crucible Company, Bridgeport, Conn., whose factory was recently destroyed by fire, are erecting a temporary structure in which they will carry on the business for the present.

The John Russell Cutlery Company, Turner's Falls, Mass., are running eight hours a day.

The Stanley Rule & Level Company, New Britain, Conn., will shut down December 21 for inventory. All contracts between employers and employees will be void after that date. The employees are fearful that the directors may conclude to let the factory remain closed until the tariff question has been definitely settled.

A company has been established at Faribault, Minn., for the manufacture of the Doran automatic band cutter and self feeder, with officers as follows: W. E. Blodgett, president; F. A. Berry, treasurer; W. E. Blodgett, F. A. Berry, D. W. Grant and Stephen Jewett, directors.

The nail mill of the Carnegie Steel Company, at Beaver Falls, Pa., has been shut down for an indefinite period. About 300 men are thus out of employment. This action on the part of the company was a great surprise, as the nail mill has been running full force for some time. The company have assigned no cause for the action, except that the present price at which nails are sold would not justify them in continuing to run their works.

The Hammond Buckle Company, Rockville, Conn., have purchased the plant of the Chapman & Armstrong Mfg. Company, at Waterbury, and will remove their business to that point.

The Blair Lamp Adjuster Company of Omaha, Neb., have filed articles of incorporation. The company have an authorized capital of \$50,000. The directors are W. J. C. Putnam Cramer, H. F. Robertson and William Whitmore.

The new bolt shop of the Peck, Stow & Wilcox Company, Southington, Conn., will be ready in about a week.

D. M. Osborne & Co., manufacturers of implements, Auburn, N. Y., state that they propose to continue the manufacture of their entire output in that city as long as present conditions of labor and freight continue, although handsome inducements have been made to them for the transfer of all or part of their business to points in the West.

The Eaton, Cole & Burnham Company, Bridgeport, Conn., are running full force on half time.

Keystone Lock Works, Lancaster, Pa., for whom Surpluss, Dunn & Alder, 97 Chambers street, are agents, have largely increased their facilities for making special padlocks, and now believe themselves to be among the largest producers of this class of goods. With their new foundry now in operation they are now making all their own castings.

The plain wire and barb wire departments of the plant of the Baackes Wire Nail Company, at Cleveland, Ohio, will probably be started up during this week, giving employment to about 100 men. The affairs of this concern have been in the hands of J. Q. Riddle, receiver, for some months past.

The Union Metallic Cartridge Company, Bridgeport, Conn., are running full time and full force.

The Torrance Iron Company of Troy, N. Y., have been reorganized. G. L. French has been elected president, C. A. McLeod vice-president, and N. H. Squires secretary and treasurer. The company make a specialty of malleable iron castings for stove trimmings and tinner's hardware.

The nail mill of the Atlantic Iron Works, Sharon, Pa., has resumed operations.

An accident to the engine in the chisel works of Charles Buck, Millbury, Mass., has caused a shut down of about a week.

The T. C. Richards Hardware Company, West Winsted, Conn., are working 50 hours a week.

The Kinsey Implement Company and the Henry Lee Implement Company of Denver, Col., have been consolidated under the style of the Lee-Kinsey Implement Company. The new company are incorporated, with a capital of \$250,000. The directors are Henry Lee, Charles Reed, Joseph Kinsey and Eugene Conant.

As already noted in these columns, S. P. Husselman of Wooster, Ohio, has purchased the entire interest of J. H. Logan, Geo. B. Logan and Edward P. Logan of Pittsburgh in the Logan & Strobbridge Iron Company, New Brighton, Pa., and the interest of J. H. Logan in the old New Brighton Cutlery Building Association, the building of the latter now being occupied by the Robingson Mfg. Company. The consideration of the purchase is said to be about \$50,000. The plant of the Logan & Strobbridge Iron Company consists of six lots, occupying the square between First, Second, Butler and Locust streets in the center of New Brighton, upon which are located the brick foundries, machine shops, planing mill, warehouse, office, &c., of the company. In these buildings are manufactured a varied line of coffee, corn and spice mills, builders' and house furnishing hardware, light gray iron castings, &c., the firm having been manufacturing these goods for the past 20 years. In addition to this line, with the advent of Mr. Husselman, will be manufactured railroad, farm and yard fencing under the Husselman patents. The company at present employ about 100 men, which force will be increased when the fence trade opens up in the spring. The plant of the Robingson Mfg. Company, who recently purchased all the effects of the Cutlery Building Association, and are included in the deal, is located on the bank of the Beaver River, at the foot of Mill street, New Brighton, and occupies an entire square, on which is located a large two-story frame building, which contains power, machinery, furnaces, &c., necessary for the manufacture of brass castings, Babbitt metal and solder. In addition to this is an electroplating plant. There will be no change in the management of the Logan & Strobbridge Iron Company, excepting that Mr. Husselman takes the place of J. H. Logan as a director. Every effort will be put forth by the management to increase the business of both concerns. The Logan & Strobbridge Iron Company is a close corporation, the stockholders being Turner Strobbridge, L. Roggen Strobbridge, C. C. Robingson and S. B. Husselman.

Joseph Dixon Crucible Company, 63 Reade street, New York, manufacturers of pencils, crucibles and graphite products, note signs of improvement lately in their business, although not to so great an extent as could be wished. They have instituted some improvements and betterments at their works, and are prepared to promptly execute orders.

The new plant of the United Indurated Fiber Company, Lockport, N. Y., has commenced operations. The plant will soon be running full force and will employ 300 men.

Stoughton Rubber Company, Boston, Mass., are manufacturers of rubber clothing, and in connection with their own product handle druggists' sundries and mechanical goods. They are also agents for the New York Belting & Packing Company.

The American Wire Nail Company, at Anderson, Ind., are enlarging their galvanizing department. Reports are in circulation that the company are about to secure control of the nail plant of the Hazen Company.

The Times of Alexandria, Ind., states that arrangements have been completed for the location of the Kelly Axe Company's factory at that point. Those interested are confident that the works will be in operation by March.

The plant of the spoke and handle factory of Gurley is to be removed to Huntsville, Ala., and the capacity is to be greatly increased.

The E. Warren Axe & Tool Works, Warren, Pa., have been succeeded by the Warren Axe & Tool Company, incorporated with a capital of \$25,000, and with a capacity of 50 dozen axes a day. They have improved machinery and call special attention to the quality of their goods.

Ellwood Shafting & Tube Company, Ellwood City, Pa., are now in a position to execute orders for seamless cold drawn tubes, made from genuine Swedish steel. At present the range of sizes is from 1/4 inch to 1 1/4 inches, inclusive, 18 feet lengths. Reference

is made to the tubes being perfectly smooth inside and out, while it is said the variation between inner and outer walls is within 1-1000 part of an inch. The buildings of the plant are two in number, each 250 x 160 feet in dimensions.

Yale & Towne Mfg. Company, 84-86 Chambers street, New York, on the afternoon of December 2 commenced the removal of 4000 old lock boxes in the New York Post Office, which have done duty since 1870. By working continuously they finished replacing them by the afternoon of the next day with 3100 new boxes fitted with Paracentric locks and keys, which are made of this particular kind for the United States Government only. The new boxes have a bronze front, beveled glass windows and perforated bottoms to prevent the accumulation of dust.

The Colebrookdale Iron Company, Pottstown, Pa., whose New York office is at 103 Reade street, in charge of Duncan K. Major, advise us that while they have not run full handed on their other work, such as japanned castings, rolling mill castings, &c., they have done so on their sad irons since the beginning of the year, which they refer to as an exceptional experience. They state that they have no stock of any account at the present time, but they expect to have a fair stock of irons by the first of January for next season's orders.

Miscellaneous.

The Manhattan Rubber Mfg. Company have been incorporated under the laws of New Jersey, with a capital stock of \$150,000. The incorporators are Peter Reid of Reid & Barry Company, Passaic, N. J.; Samuel Watson of the Watson Machine Company, Paterson, N. J.; Frank Cazenove Jones, recently of the New York Belting & Packing Company, Limited, New York; W. W. Dashiell of W. W. Dashiell & Co., New York; A. F. Townsend, New York, and George Woffenden, Passaic, N. J. The company will manufacture all kinds of mechanical rubber goods including belting, packing, hose, emery wheels and bicycle tires, and will make a specialty of molded goods. Offices and warehouses have been opened at 64 Cortlandt street, New York City, and the company have leased the entire premises for five years. The plant is at Passaic, N. J. The officers of the Manhattan Rubber Mfg. Company are: Frank Cazenove Jones, president and general manager, and A. F. Townsend, secretary and treasurer. George Woffenden will have entire charge of the factories and Julius Kahn will be selling agent for the new company.

The State Street Horse Railway Company, at New Haven, Conn., have placed the contract for the roof on their new power house with the Berlin Iron Bridge Company of East Berlin, Conn. The building will be 84 feet wide and 250 feet long, the roof trusses being of iron, covered with slate.

The citizens of New London, Conn., have not yet relinquished their effort to get the Bath Iron Works of Bath, Maine, removed to that city. It has been suggested that a public subscription be started with this end in view.

The Ducktown Sulphur, Copper & Iron Company, Limited, have resumed operations at their works at Ducktown, Tenn.

The entire night force of the Elmira Bridge Works, Elmira, N. Y., has been laid off. The cause is believed to be but temporary. The trouble is said to be mainly caused by the specifications in the contracts which call for work to be commenced at certain dates. For instance, the date of the beginning of the works on the \$1,250,000 New York Central viaduct contract is next March.

The Consolidated Car Heating Company's plant, Van Tile & Co.'s boiler shop and James McKinley & Sons' architectural iron works, at Albany, N. Y., are now running overtime.

The Committee on Manufactures of the Albany, N. Y., Business Men's Association has secured another industry for that city in the shape of the Oneida, N. Y., Spring Bed Mfg. Company.

It is reported that the Shuler Spring Works of Amsterdam, N. Y., which have been running a few days each week, will shut down again.

The Aluminum Smelting & Refining Company will shortly put in operation their smelting works, at Turner, in Kansas, a few miles west of Kansas City. It is stated that they will manufacture aluminum from native clay.

TRADE REPORT

As expected, the whole Iron and Steel trades are in a very comatose condition, nor is much improvement expected until the future is revealed, so far as the tariff is concerned. Reports are very conflicting, but on the whole tend in the direction that the Wilson bill will be forced through without serious amendment. Still, this circumstance deserves consideration on the other side, that the Washington correspondents proved pretty poor prophets lately when they foreshadowed the provisions of the Wilson bill and may be found erring again this time.

Welcome as an improved tendency would be, it is useless to deny that the incipient bull movement fathered by one of the Birmingham companies arouses little enthusiasm with other sellers and is not frightening buyers to any considerable extent. While it is to be sincerely hoped that it not a false start, the general situation does not encourage sanguine views very much. It is true that there have been speculative purchases, say 18,000 tons in all, 5000 tons of warrants having been transferred to England from New York and the rest having been bought in Philadelphia, also for English parties. Then the large Pipe contracts lately placed have led to covering, so that the sales have been heavy. But they have not filled up many sellers, who continue to offer Iron at the old rates. It is a fact, however, that further liberal Cast Iron Pipe contracts are in the market, say about 25,000 tons in all. On the other hand, the general foundry trade is very dull, and, for instance, in Chicago there have been requests for delaying deliveries of Iron.

Our Philadelphia correspondent puts finally at rest all doubts concerning the Steel Rail arrangement by showing from the court records that the Maryland and Pennsylvania have received bonds to the aggregate amount of \$380,000 as a forfeit on orders for 400,000 tons. Some people may be able to guess who the buyers are. When the history of the last six weeks of the Rail trade is written it will be acknowledged to be among the most checkered recorded in the Iron industry.

In Soft Steel the markets have been quiet, there being relatively little new business coming up. In Finished Material the struggle for work continues, with its attendant extremely low range of prices. An interesting event during the week has been the first appearance as a bidder on bridge work of the Illinois Steel Company, the occasion being the 3500-ton contract for the Milwaukee viaduct.

Heavy pressure has been put on the Plate market lately by a Pittsburgh firm whose order book had been swept clear for present delivery of a number of large contracts by postponement.

There is more activity in Girder Rails. It is estimated that there are in sight new orders for about 20,000 tons of Rails, and that about 10,000 tons of deferred work is on the eve of being taken. The latest order for about 2200 tons, for Indianapolis, went at a low figure.

Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., December 5, 1893.

The situation in the Iron and Steel trade shows no improvement, and in view of the tariff agitation and the near approach of the holidays no improvement ought to be expected. It is a long, dreary road to travel, and while the immediate outlook is the reverse of encouraging, there can be no doubt that the turn will come some of these days. Meanwhile with such changes as are proposed in the new tariff there is no possibility of any new business beyond what is indispensable for immediate requirements. Low as prices are, they will have to be still lower if foreign competition has to be met, and as that appears to be the object of legislation, there is no alternative but to wait and see what will be done. Is it any wonder, therefore, that the last month of one of the worst years that the Iron trade has ever known is the worst in the entire series? Business is duller, prices are lower, and the outlook appears to be gloomier than at any time during the whole year, and yet for aught that any one knows to the contrary, it may be just the time when things may take a turn; the very reverse of what everybody expects. If it is the unexpected that happens it could hardly come at a better time than right now.

Pig Iron.—There is no perceptible change in this department. The reported 50¢ advance by one of the Southern companies falls very flat, and does little more than provoke a smile. Anybody can ask an advance, and it is entirely proper to do so at such prices as have been ruling during the past two or three months, but whether any one will pay it or not is another thing entirely. In this market the supply, while perceptibly smaller, is nevertheless as large in proportion as at any time during the whole year. There is very little Iron wanted, and what is wanted can be easily secured at the old prices, and in some cases at a little less than that. Consumption is very light, and will be still lighter during the next 30 days, so that there is no incentive for placing orders ahead, and especially so while the tariff is unsettled. To-day's asking prices are about as follows, with sales chiefly in small lots:

No. 1 Foundry	\$13.75 @ \$14.25
No. 2 Foundry	13.00 @ 13.25
Standard Gray Forge	12.00 @ 12.50
Ordinary Gray Forge	11.50 @ 11.75

Steel Billets.—No business of any account has been done during the past week or ten days. Small lots have been taken at \$19.50 @ \$19.75, delivered, but good buyers would have no difficulty in placing 1000-ton orders at \$19.25, perhaps less than that on the right kind of an offer.

Steel Rails.—There is some inquiry for fair sized lots, and intimations that orders would be placed if special rates were named. The price is \$24, however, and there will be no deviation from that figure on standard sections. From the court records it appears that the Maryland Steel Company have accepted an offer for 300,000 tons Rails and the Pennsylvania Steel Company 100,000 tons at \$25 per ton. The buyers give bonds for the payment of \$300,000 to the Maryland Steel Company in case that they fail to take delivery during 1894, and for \$80,000 to the Pennsylvania Steel Company if they fail to take theirs, but the companies are also bound to accept no orders for

this class of Rails until the lots as above named have been taken. The companies will therefore either get the business or the forfeit of \$300,000 and \$80,000 respectively.

Finished Material.—There is little or no change to note, business being slow and for small lots, at the lowest of the low figures heretofore ruling. There are no large orders in the market, and even those for ship-building that seemed likely to go through last week are either postponed or withdrawn. In point of fact, there is nothing but small orders around, and those that look for anything else meet with nothing but disappointment. Mills that look after the smaller trade are doing fairly, but at the same wretchedly low prices as before, which are nominally as follows, but on good sized lots there is no difficulty in securing liberal concessions:

Grooved Skelp, delivered.	1.45¢	@	1.50¢
Best Refined Bars.....	1.45¢	@	1.55¢
At interior points.....	1.35¢	@	1.40¢
Tank Steel.....	1.45¢	@	1.55¢
Heavy Plates.....	1.50¢	@	1.60¢
Shell.....	1.60¢	@	1.75¢
Flange.....	1.90¢	@	2.00¢
Angles.....	1.60¢	@	1.70¢
Beams and Channels.....	1.75¢	@	1.90¢

Old Material.—Market extremely dull, and prices less firm than they were a week ago. Asking prices are about as follows, but under pressure to realize, lower figures have to be accepted:

No. 1 Wrought Scrap, delivered.....	\$11.50	@	\$12.50
Machinery Cast, delivered	10.00	@	11.00
Heavy Steel Scrap, delivered.....	11.50	@	12.50
Old Iron Rails, delivered.	14.00	@	14.50
Old Street Rails, delivered.....	15.50	@	16.00
Wrought Turnings, delivered.....	10.00	@	11.00
Cast Borings, delivered...	6.50	@	7.00
No. 2 Light Scrap.....	6.50	@	7.50

St. Louis.

(By Telegraph.)

Office of *The Iron Age*,
Bank of Commerce Building,
St. Louis, December 6, 1893.

Pig Iron.—There is not much demand and prices are unchanged. There is practically no cheap Iron in the market at present and consumers cannot be induced to stock up on to-day's prices. For the past six months certain users of Iron, generally carload buyers, have been making their purchases only when cut prices were the inducement. Now that these prices have been withdrawn, they are not in the market. A hand to mouth trade is the report from all furnace agents. Quotations are unchanged, as follows, which are for cash, f.o.b. cars St. Louis:

Southern Coke, No. 1 Foundry.....	\$13.25	@	\$13.50
Southern Coke, No. 2 Foundry.....	11.50	@	11.75
Southern Coke, No. 3 Foundry.....	10.75	@	11.00
Southern Gray Forge.....	10.25	@	11.50
Southern Car Wheel.....	17.25	@	18.25
Lake Superior Car Wheel..	16.50	@	17.00
Ohio Softeners.....	16.00	@	16.50

Bar Iron—Local jobbers state that trade is exceedingly dull, and prices range between 1.70¢ and 1.75¢, according to quantity. Mills are only running about half time, and are making some very low prices. Nominal quotations from mill are 1.40¢ @ 1.45¢, but these prices are shaded.

Barb Wire.—The demand for Barb Wire is moderately active. Mills quote \$2 for carload lots of Painted to jobbers, and Galvanized at \$2.40. Locally job-

bers quote Painted at \$2.10 @ \$2.15, and Galvanized at the usual advance of 40¢ per hundredweight.

Wire Nails.—There is a lively trade reported by the mills, but prices are unsatisfactory. Sales are reported as low as \$1.35 for lots of from 3000 to 5000 kegs. Mills quote \$1.40 @ \$1.45 for carload lots to jobbers. Store price is \$1.50 @ \$1.55.

Rails and Track Supplies.—Track Supplies are dull and prices inclined to weakness. We quote as follows: Splice Bars, 1.65¢ @ 1.70¢; Spikes, 2¢ @ 2.05¢; Bolts, Square Nuts, 2.40¢ @ 2.45¢; with Hexagon Nuts, 2.50¢ @ 2.55¢; Links and Pins, 1.90¢. Old Rails are dull at \$13.50. Steel Rails are unchanged at \$27 @ \$27.50.

Pig Lead.—The offerings of this metal have been quite free, and 3.17½¢ @ 3.20¢ has been made during the past week. Considerable uneasiness exists regarding the effect of the proposed tariff, which, it is pretty generally conceded, will have the effect of causing a decided slump in prices.

Spelter.—The demand for Spelter has been fairly good since our last report, and prices have improved somewhat. Sales have been made at 3.45¢ @ 3.50¢, the closing transactions to-day being made at the latter figure. Choice brands commanded 3.60¢.

Chicago.

(By Telegraph.)

Office of *The Iron Age*, 59 Dearborn street,
CHICAGO, December 6, 1893.

The market continues quiet, notwithstanding the efforts to force business by sellers in various lines. The attempt by Southern Pig Iron manufacturers to advance prices is persisted in, but it does not frighten consumers into buying.

Pig Iron.—While there is some movement in small lots of local and Southern Coke Iron, it is confined entirely to the absolute necessities of consumers. Inquiries for good sized lots of Southern Iron have led to no business, on account of the high prices asked by nearly all the Southern companies. Buyers seem to consider the upward movement only a bluff and will wait to see whether it can be maintained or is only a temporary incident. A discouraging feature of the situation at present is the decrease in shipments to consumers, who are to a considerable extent asking for postponement of deliveries on contracts. This shows a falling off in the foundry business, which for the past month or six weeks had materially improved. Some sales of Charcoal Iron are reported at prices a shade under our quotations. Quotations are now as follows for cash:

Lake Superior Charcoal.....	\$15.50	@	\$16.00
Local Coke Foundry, No. 1....	13.50	@	14.00
Local Coke Foundry, No. 2....	12.75	@	13.00
Local Coke Foundry, No. 3....	12.25	@	12.75
Local Scotch.....	14.00	@	14.50
Ohio Strong Softeners No. 1..	15.50	@	16.00
Southern Silvery, No. 1.....	13.75	@	14.00
Southern Silvery, No. 2.....	13.25	@	13.50
Southern Coke, No. 2.....	12.15	@	12.40
Southern Coke, No. 3.....	11.65	@	11.90
Southern, No. 1, Soft.....	12.40	@	12.65
Southern, No. 2, Soft.....	11.65	@	11.90
Tennessee Charcoal, No. 1....	16.00	@	16.50
Southern Gray Forge.....	10.60	@	10.85
Alabama Car Wheel.....	18.25	@	18.50
Jackson County Silvery.....	16.00	@	16.50
Other Ohio Silvery.....	15.00	@	15.50

Bars.—Manufacturers report a fair week's trade, but the most of it has been secured by sacrificing prices. Sales are confined to moderate quantities only and consumers are buying for quick

delivery. The mills which were favored with season contracts are now in not much better shape than those without such contracts, as specifications are coming in slowly, involving a chase for new business. The only redeeming feature of the market is the fact that jobbers and consumers generally are short of stock and are obliged to purchase frequently. Quotations on mill shipments range from 1.35¢ to 1.40¢ Chicago, half extras, on Bar Iron, and 1.40¢ to 1.45¢ on Soft Steel Bars. Bar Iron quotations, however, are subject to shading on favorable specifications. Jobbers continue to report a good demand from stock, but prices are weak, although nominal rates are continued at 1.60¢ @ 1.70¢ for Bar Iron and 1.65¢ @ 1.75¢ for Soft Steel Bars.

Structural Material.—The Milwaukee viaduct, which will require some 3500 tons of material, has not yet been placed. Bids were received from 16 companies, among them being the Illinois Steel Company, whose advent as bridge builders is a new departure for them. The lowest bid was \$182,000, but the matter will have to be approved by the City Council. Very little other business is either reported or in sight, although expectations are entertained of a considerable amount of elevated railroad work to come up at an early day. Quotations are as follows, Chicago delivery: Beams, 1.65¢ @ 1.75¢; Tees, 1.90¢ @ 2¢; Angles and Universal Plates, 1.60¢ @ 1.65¢. Small lots are sold from stock at an advance of 10¢ @ 15¢ per 100 above these prices.

Plates.—Business in this line is very quiet; dealers are now doing very little from stock. Boiler and other consumers are seldom getting new work. Mill shipments, Chicago delivery, are quoted as follows: Tank Steel, 1.60¢ @ 1.70¢; Shell Steel, 1.80¢ @ 1.90¢; Flange Steel, 2¢ @ 2.10¢; Fire Box, 2.75¢ @ 5¢. Store prices now prevail as follows: Iron or Steel Sheets, Nos. 10 to 14, 2¢ @ 2.10¢; Tank Steel, 1.90¢ @ 2¢; Shell Steel, 2.20¢ @ 2.40¢; Flange Steel, 2.50¢ @ 2.65¢; Boiler Tubes, 70 and 5¢ off.

Sheets.—A few sales of Black Sheets have transpired; the largest of them was for 50 tons. Mill shipments of No. 27 Common are selling at 2.65¢ @ 2.70¢, Chicago, while Steel commands an advance of \$1 @ \$2 per ton. Small lots of Iron from stock are selling at 2.90¢ @ 3¢. stock. Galvanized Iron is moving in very small quantities at about 75¢ off for Juniata on mill shipments and 70 and 5¢ for small lots from stock. The low price of Galvanized Iron is causing it to be substituted quite considerably for Black Sheets in roofing, as well as in other lines of large consumption. Copper Sheets are advancing on account of the higher prices of Ingot Copper. They are now quoted at 25 and 5¢ off @ 30¢, according to quantity.

Merchant Steel.—Specifications are not being received by mill representatives in as large quantities as a couple of weeks since, but are still coming forward fairly well. A few consumers have placed season contracts within the past week, but it is now believed that about all the large concerns have covered their requirements. Those who came in lately for the purchase of Steel specialties have profited by their long delay, as they were able to contract at much lower prices than ruled early in the season. Quite a good business has recently obtained in small lots for quick delivery. Mill shipments, Chicago delivery, are quoted

as follows: Smooth Finished Machinery, Tire and Open Hearth Spring Steel, 1.90¢ @ 2¢; Ordinary Bessemer Machinery, 1.60¢ @ 1.65¢; Ordinary Bessemer Tire, 1.55¢ @ 1.60¢; Ordinary Tool Steel, 6¢ @ 7¢; Specials, 12¢ and upward.

Billets.—Nothing new has occurred under this head, and quotations are unchanged at \$19.25 @ \$19.50, Joliet.

Rails and Track Supplies.—Inquiries are improving for small quantities of Steel Rails, which the local manufacturers are not always able to meet, as they have but a limited stock on hand. There are indications that some of the large buyers may soon come into the market, but thus far nothing has occurred on which to base an estimate of next year's probable business. Quotations range from \$25 to \$26 75, according to the size of the order. Fastenings are unchanged at 1.50¢ @ 1.60¢ for Splice Bars; 2.55¢ @ 2.60¢ for Track Bolts with Hexagon Nuts, and 1.90¢ @ 1.95¢ for Spikes.

Old Rails and Car Wheels.—Old Iron Rails are weaker, as the railroads are more anxious to sell. The near by mills are now being supplied at \$14, delivered, and are not obliged to buy in large quantities to get this price. Old Steel Rails are quoted at \$7.25 @ \$10, according to length, on the basis offered by Pittsburgh dealers. Old Car Wheels are wholly neglected.

Scrap.—There is demand for all kinds of Scrap, but dealers are not looking for heavy business at this time, with the end of the year approaching. Our quotations fairly represent the condition of the market, sales being made occasionally at lower and sometimes higher prices than those given. Quotations are maintained at old figures: No. 1 Forge, \$10; No. 1 Mill, \$8; Sheet Iron, \$4.50; Pipes and Flues, \$8; Axles, \$16; Horseshoes, \$11; Fish Plates, \$12; Spikes and Bolts, \$10; Cast Borings, \$4.50; Wrought Turnings, \$6.50; Axle Turnings, \$8; Heavy Cast, \$9.50; Stove Plate, \$7.75; Malleable Cast, \$8; Mixed Steel, \$7, gross ton; Leaf Steel, \$14 50.

Metals.—Lake Copper is now quoted at 11¢ for carload lots and 11½¢ for less than carloads. The advance is caused wholly by the export demand, as the domestic movement continues light. Casting Copper is also advancing, carload lots now being quoted at 10¢. Inquiries from consumers of this grade are considerably larger than they were. Spelter is quiet, but quoted at 3.50¢ @ 3.55¢, according to brand. Lead is weak. Refiners are quoting 3.20¢, but are selling very little at that price, as consumers are holding off for still lower figures.

A. H. Dunham & Co., Pig Iron merchants, have removed from the Monadnock Block to room 44 in the Illinois National Bank Building, 115 Dearborn street, Chicago.

The blooming train in the plant of the Wheeling Steel Works, owned and operated by the Wheeling Steel & Iron Company, at Wheeling, W. Va., has recently been increased from 60 feet to 180 feet in length. Tests of the new train were made last week and were highly satisfactory. It is probable that this plant will resume operations about the first of the year.

Pittsburgh.

(By Mail.)

Office of *The Iron Age*, Hamilton Building, }
PITTSBURGH, December 5, 1893.

The indorsement of the Wilson tariff bill by the President in his message to Congress will no doubt have considerable influence on that measure and largely increase the chances of it going through without material revision. That this will add to the demoralization now existing in the Iron and Steel trades is generally admitted, as everybody, whether a large or small buyer, will purchase just as little as he can until it is actually known what will be done with the measure. Since our issue of last week the trade have had opportunity to thoroughly digest the bill, and now that the radical changes proposed are fully comprehended the opposition to its being made a law becomes stronger. The Tinned Plate Manufacturers' Association is in session in this city to-day, and it is probable that a committee will be appointed to go to Washington and endeavor to have the present duty of 2½¢ @ 1¢ on Tin Plate retained, or at best only slightly reduced. Makers of other materials seriously affected will also doubtless have representatives in Washington to guard their interests as much as possible. The Iron and Steel trades remain in the same condition as noted last week. Demand is very limited, and prices show no improvement whatever; on the contrary, have shown a weaker tendency in certain directions. Foundry Coke has been cut 20¢ @ ton, and there are some who predict Furnace Coke will be affected to some extent, but in view of the already low price at which Furnace Coke is selling this is not thought probable.

Pig Iron.—The market is practically in the same condition as noted in our report of last week. The amount of metal changing hands is small and prices are showing signs of weakness, especially on Bessemer. The trouble with the market just now is that not enough Iron is being consumed and too much is being made. Of course we take into account the fact that production has been cut in half and all that, but at the same time consumption has been reduced just as much and perhaps more. Where one consumer of Pig Iron can be found who is running his plant full time, ten can be found who are running to half capacity or less. Then, again, the stocks of Pig Iron on hand are very heavy, and as long as these conditions confront the market any betterment in price is out of the question. We quote as follows:

Neutral Gray Forge...	\$10.50 @	.....	cash
All-Ore Mill.....	10.50 @	\$10.75	"
Bessemer	11.00 @	11.25	"
No. 1 Foundry.....	12.50 @	13.00	"
No. 2 Foundry.....	11.50 @	12.00	"

We note a sale of 1000 tons of Bessemer for December and January delivery at \$11, Pittsburgh. Also 1500 tons of Bessemer, same delivery, at \$11.10, Pittsburgh. Reports are going of sales of Bessemer at somewhat below our lower quotation.

Ferromanganese—We note a sale of 50 tons of domestic at \$52.50, delivered at buyer's mill. We quote the market at \$52 @ \$52 50, delivered.

Billets.—No material changes in the Steel market have occurred within the last week. All the Steel plants in the Pittsburgh district are in operation and all have more or less business. In the Wheeling district the mills are also in operation, with the exception of the

Wheeling Steel Works of the Wheeling Steel & Iron Company, and it will probably start about the first of the year. We quote the market at \$17 @ \$17.25 at maker's mill.

Plates.—Tank Steel is in good demand, but prices are as low as ever. We quote as follows: Tank Steel at 1.35¢ @ 1.40¢; Flange Steel, 1.65¢ @ 1.75¢; Shell, 1.55¢ @ 1.60¢; Fire Box, medium quality, 2½¢ @ 3¢, best quality, 3½¢ @ 4¢.

Structural Material.—Pittsburgh has taken the contract for Beams for a new court house to be erected in a far Western State and a fairly large tonnage is involved. The price is said to have been somewhat below our lower quotation. We repeat quotations of last week, as follows: Beams up to 15 inches, 1.50¢ @ 1.60¢. For desirable orders our lower quotation would be shaded. Angles and Universal Plates, 1.50¢ @ 1.60¢; Tees, 1.70¢ @ 1.75¢.

Muck Bars.—The demand is very light and prices are unchanged at \$20.50 @ \$21 for best grades, delivered at buyer's mill.

Steel Rails.—The local mill went on again yesterday morning on Rails. The report that it has secured an order for 40,000 tons from the Lake Shore road has been officially denied. Very little new business has been placed, but several contracts are expected to be let after the first of the year.

Bars.—Some mills report that orders are holding up pretty well, while others say a dropping off has occurred. As we are now so near the close of the year it is not improbable that a good many buyers will hold off placing their orders until after the first of the year. The report that the puddlers of the National Rolling Mills of the National Tube Works Company, at McKeesport, Pa., had agreed to accept \$4 @ ton for boiling is untrue. No request for such a low rate has been made by the firm. The Valley mills are running to a greater or less extent, but none of them to full capacity, as has been stated. Bars are held at 1.30¢, half extras, by the Valley mills, and a determined effort is being made to maintain that price. Steel Bars are held at 1.30¢ @ 1.40¢, with Bar Iron extras, the price depending altogether on the nature of the order.

Wire Rods.—The market is active, and Rods are held at \$24.50 @ \$25, at maker's mill. Very few Rods for this month are to be had, and for this delivery our higher quotation is obtained. It is the impression that higher prices for Rods will soon prevail.

Barb Wire.—Inquiries for Wire for delivery next spring are now coming in, and some business has already been placed. The Barb Wire department of the plant of the Baackes Wire Nail Company, at Cleveland, started up on the 4th inst. on double turn. We quote Four-Point Galvanized at \$2.20 in carload lots, and \$2.30 @ \$2.35 in less quantities. For round lots our lower quotation would probably be slightly shaded. We quote Plain Wire at \$1 45 for Nos. 6 to 9 in carload lots. This price would be shaded for desirable business.

Wire Nails.—On Monday, the 4th inst., freight rates on Wire Nails from Pittsburgh territory to Texas common points were advanced from 42¢ to 84¢ @ 100 lb. In one day recently the HP Nail Company of Cleveland turned out 5652 kegs of Wire Nails. This is

claimed to be the largest record for production in any one day ever made by one concern. There is a good demand, and inquiries for delivery into the first quarter of next year are plentiful. However, makers generally are refusing to take such contracts at present prices. We quote Wire Nails at \$1.20 in carload lots and \$1.15 in round lots, for close delivery. The rise in the river has allowed large shipments of Cut Nails to be made to Southern points by the Wheeling mills. We quote Cut Nails at \$1 in carload lots and 95¢ for larger sized orders with desirable specifications.

Pipe and Tubes.—It is said that the demand for Pipes and Tubes is equal only to about 45% of the capacity of the mills for production. Prices are no better, and on some lines are somewhat lower.

Skelp Iron.—The market is without change, and we continue to quote Grooved Skelp at 1.37½¢ @ 1.50¢ and Sheared at 1.45¢ @ 1.60¢, according to order.

Coke.—Under date of December 1, the H. C. Frick Coke Company announced a reduction of 20¢ per ton in Foundry Coke, and this cut has been promptly met by other makers. It is expected that additional contracts for Furnace Coke will be closed before the first of the year. For the week ending Saturday, November 25, there were 7480 active and 10,039 idle ovens, with a total estimated production of 68,145 tons. We quote as follows: Furnace Coke, \$1.10; Foundry Coke, \$1.30 to dealers and 1.45 to consumers. Crushed Coke, \$1.75 to consumers, all in tons of 2000 lb, on board cars in Connellsville region.

Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fifth and Main Sts.,
CINCINNATI, December 6, 1893.

There has been a cessation of Pig Iron buying during the week and no large contracts have been made for either long future or early delivery, but there have been liberal shipments on contracts recently made. The proposed new tariff, as published, seems to have restricted buying of Pig Iron, and while this may be greatly modified and seems almost sure to be before it can become a law, there is a disposition to hold off for the present at least. No business of importance is anticipated during the remainder of the month, and it is not improbable that the dullness may be greatly prolonged. There is, therefore, more willingness to sell at the prices recently accepted for delivery until next April, or even longer, but it is useless to make the tender when there are no buyers, while, in fact, the recent sales have made the furnaces comparatively independent and there is no such urgency to sell as would cause lower prices to be accepted. There have been few sales in this district beyond carload lots, but there have been some orders from the East of 500 to 1000 tons. There is little movement in Charcoal Iron, but it is not pressed for sale. Quotations are as follows:

Foundry.

Southern Coke, No. 1.....	\$12.25 @	\$12.50
Southern Coke, No. 2.....	11.00 @	11.25
Southern Coke, No. 3.....	10.50 @	10.75
Ohio Soft Stone Coal, No. 1.....	15.50 @	16.00
Ohio Soft Stone Coal, No. 2.....	14.50 @	14.75
Lake Superior Coke, No. 1.....	15.00 @	15.25
Lake Superior Coke, No. 2.....	14.00 @	14.25
Hanging Rock Charcoal, No. 1.....	18.50 @	19.00
Hanging Rock Charcoal, No. 2.....	17.50 @	18.00
Tennessee Charcoal, No. 1.....	14.00 @	14.25
Tennessee Charcoal, No. 2.....	13.00 @	13.25

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	17.75 @	18.00
Lake Superior Car Wheel and Malleable.....	17.00 @	17.25
<i>Forge.</i>		
Gray Forge.....	10.00 @	10.50
Mottled Coke.....	9.75 @	10.00

Financial.

It would not be easy to point out any particular direction in which the financial situation displays either improvement or the reverse, as compared with the situation of a week ago. The business world in general is again waiting for Congressional legislation to relieve uncertainty, just as it did in the early fall while the fate of the silver purchase repeal bill was hanging in the balance. The present session of Congress has an unusually important task before it in the decision of the tariff, internal revenue and other equally pressing questions intimately affecting the financial and commercial interests of the country. On the outcome of legislation in these matters will depend largely the course of business in the immediate future. Merchants, manufacturers, and bankers will naturally await the result with anxiety, and until the course of legislation is assured the establishment of confidence and any material expansion of trade cannot reasonably be expected.

The overstocked money market at present existing is strong evidence that obligations are being curtailed instead of increased. It shows a great shrinkage in the volume of trade and an absence of enterprise and speculation almost unparalleled. Nearly \$198,000,000 idle cash lies in the banks of New York alone, being \$76,000,000 more than legal requirements, by far the largest surplus on record; and this condition is repeated in all the important money centers of the country. Meanwhile the volume of money in general circulation was increased last month by \$8,500,000, bringing the total circulation of the country, on December 1, up to \$1,726,094,290. The increase has been \$45,500,000 in the past three months; and the present circulation is about \$112,000,000 greater than it was a year ago. At the same time the volume of business, as shown by Clearing House exchanges, during the last two weeks of November is 23.3 per cent. smaller than a year ago. There is, moreover, no indication of an early cessation in this accumulation of idle capital, and the situation only serves to prove how extensive has been the business upheaval of this year. One more favorable feature of Saturday's bank statement was an increase in loans of \$4,288,400; but this expansion is explained as being largely due to advances on grain and cotton, which will be canceled shortly on the exportation of the commodities. Part of it also represents renewals of purely speculative accommodations; and but little indicates permanent extension of credit. The glut of unemployed money is having its natural effect in lowering rates of interest and to a certain extent stimulating speculative buying, but the latter is far below the average in extent. So great has been the congestion in bank reserves that borrowers are willing to loan money on almost any terms, and the spectacle of borrowers begging for loans, which was seen in August, is now entirely reversed. Borrowers are few and lenders many.

So pronounced has become the ease of the loan market that the banks and trust companies are considering the re-

duction of interest on permanent deposits, which have usually commanded by large depositors from 2% to 2½% easily. With the immense reserve funds at present held, however, these deposits are being largely carried at a loss, and some steps will have to be taken to relieve the pressure. As it is, very few banks or trust companies will open new deposits subject to any interest whatever. The call loan market is abundantly supplied with funds, 1% being the usual basis and 1½% the outside figure asked. Time loans are offered far in excess of demand, rates being 2% for 30 days, 2½% for 60 days, 3% for 90 days to four months and 3½% @ 4% for five and six months. Even these rates are shaded for choice securities. Commercial paper is in active demand at 3½% @ 4% for best indorsed receivables and 4½% @ 5% for single names, the supply being light.

The annual report of the Controller of Currency, just issued, shows 3976 national banks to have been in operation at the close of the report year, with a capital stock of \$695,558,120, represented by 7,450,000 shares held by 300,000 shareholders. During the year 119 banks were organized and 158 suspended. Of this number 86, with a capital stock of \$18,205,000, resumed, and 65 passed into the hands of receivers, with a capital stock of \$10,885,000. At the close of the year seven remained in the charge of examiners pending resumption. A comparison of the history of the banks for the year 1893 with that of 1892 shows the following changes: Banks organized decreased 44, receiverships increased 48, voluntary liquidations decreased 7, corporate extensions decreased 47, expirations of corporate extensions decreased 7. The total gain of active banks was 8, and the increase in capital stock was \$1,689,455. The Banking and Currency Committee of the House are to meet this week for the purpose of framing a bill for repealing the State bank tax.

The stock market was encouraged toward the close of last week by a better feeling in London in respect of American securities. Some large purchases of railroad shares for foreign account were made on Friday and Saturday. This circumstance tended, together with some favorable returns of Western earnings, to tone the market for railroad stocks in general. Several denominations, notably St. Paul, Atchison, Union Pacific and Louisville, scored material advances accordingly. The last named stock rose on the news of the company having succeeded in paying off the loan which they secured in London some time ago. The unsatisfactory feeling in regard to the Wilson bill, which operated to depress most of the "industrials" last week, served, however, to give a tone of hesitancy to the general stock market, which closed somewhat weak and irregular on Saturday, and opened depressed on Monday. Some foreign selling of "Americans" and decreased railroad earnings reported by Eastern trunk lines, together with one or two other discouraging features, caused a general weakening, both of railroad and industrial securities, which, notwithstanding a rally late in the afternoon, closed all round generally lower, Western Union and a few specialties suffering particularly. Tuesday's market was dull, Atchison bonds and stocks declining sharply on rumors from London of the failure of the company in an attempt to borrow \$2,000,000 in that city in order to make up their January interest. An emphatic denial was, however, given to the re-

port by the president of the company, but the general stock market failed to rally to any extent, closing moderately firm, but generally lower, especially in the "industrial" lines or securities. A plausible explanation as helping the decline in prices is given in the disappointment of Wall street in finding no definite and comprehensive financial policy announced in the Presidential message made public on Monday afternoon. The extreme fluctuations in the principal stocks since December 1 are shown in the following table, together with the closing prices on December 6:

	High- est.	Low- est.	Closing Dec. 6.
Am. Sugar Ref.....	84	80	83
Atchison, T. & S. Fé....	22	18½	18½
Balt. & Ohio.....	74½	72	72½
Chicago Gas.....	69½	67½	67½
Chic., B. & Q.....	81½	79½	79½
Chic., Mil. & St. Paul...	66½	64½	64½
Chic., Rock Isl. & Pac...	71½	69½	69½
Del. & Hudson.....	136½	134	134½
Del., Lack & Western...	168½	167	167
Gen. Electric.....	37½	32½	32½
Lake Shore.....	129	126½	127½
Louisville & Nashville...	53½	51½	51½
Manhattan.....	129	127	127
Missouri Pacific.....	27½	24½	24½
National Lead, Common...	23½	21	21½
New Jersey Central.....	118	117½	118
New York Central.....	103½	102½	102½
N. Y., L. E. & Western...	16	14½	15
Northern Pacific, Pfd...	24½	22½	22½
Philadelphia & Reading...	21½	20½	21½
Richmond & West Pt., Term.....	3½	2½	3½
St. Paul & Omaha.....	40½	37½	37½
Union Pacific.....	23½	20½	21½
Western Union.....	92½	88½	88½

Railway and miscellaneous bonds have been active during the greater part of the week. The investment demand for first-class bonds has been so large that they have become nearly exhausted, and purchasers are now turning their attention to the lower grades, many of which have advanced in price of late. The general bond market has, however, subsided into dullness this week, in sympathy with the decline in stocks. Government bonds are steady. A sale call of \$500 4s coupon at 114½ is noted. Closing prices were quoted as follows:

	Bid.	Asked.
2s, 1891, registered.....	95	.....
4s, registered.....	113	114
4s, coupon.....	114	115

Sterling exchange has been strong and higher, owing to an active demand from remitters and comparative scarcity of bills. Actual business was done on Wednesday at \$4.84½ @ \$4.84½ for sixty days; \$4.86½ for demand; \$4.87 @ \$4.87½ for cables and \$4.83½ for commercial.

Domestic exchange on New York is quoted as follows: New Orleans, commercial 200 discount, bank par; Charleston, buying par, selling ½ premium; San Francisco, sight 5, telegraph 20 premium; Savannah, buying ½ discount, selling par @ ½ premium; Chicago, par; St. Louis, 75 premium.

Bar silver has declined in price. Latest quotations in London were 32½ pence and in New York 70½¢ @ ounce. Large shipments continue to be made to Europe.

The plant of the Coleman-Shields Company, Niles, Ohio, manufacturers of pipe, casing and tube iron, is in operation, though not to full capacity. Unless a material increase in orders takes place, this firm do not expect to increase their running time to any extent.

The Harrisburg Boiler & Mfg. Company, Harrisburg, Pa., are in the hands of the sheriff, an execution for \$25,000 being issued against the firm last week.

Metal Market.

Copper.—Sales have been made recently of several million pounds of Lake Superior Ingot for future delivery, at 10½¢. The estimates range all the way from 3,000,000 to 5,000,000 lb, exclusive of what may have been done *sub rosa*, as not uncommon, by the Calumet & Hecla Company, whose agents seem to prefer "mystery" to a plain statement of facts. If the truth were known, it would probably be found that the estimate given is below the actual amount of metal involved. In any event there is strong circumstantial evidence that the smaller producers have not been the only sellers and that consumers have not been the only buyers. In other words, there is some indication of speculative movement and reason for supposition that Boston operators in mining shares have made the most of every advantage in their favor. On the Metal Exchange there has been a feeble effort in the direction of counteracting the effect of outside influences and a few "sales" were recorded there at considerably under the "street" prices. Waiving all the speculative doings, it seems very clear that 10½¢ is extremely inside price and that 10½¢ @ 11¢ fairly reflects market value from sellers' point of view. Not as much as a rumor of large dealings in other Copper comes to notice, but the line of valuation has been raised to 10¢ upward for Electrolytic, and 9½¢ @ 9½¢ for ordinary casting brands. It is denied that there is any speculative combination in the market, but circumstantial evidence to the contrary is very strong. In fact, it looks as though special effort is being made to carry prices upward on the enhanced cost of transportation consequent upon the closing of navigation, and to make the most of every condition calculated to work up sentimental or more substantial firmness to the market.

Pig Tin.—Hardly anything has been done in the speculative branch of the market, and prices have remained almost stationary throughout the week. The uncertainties connected with the proposed revision of the tariff seem to be greatly responsible for the lack of animation. General trade conditions, however, are not without influence, since they suggest very conservative action. As near as can be calculated, the consumption here is well up to the average for this season, and it is calculated that spot stocks have been cut down to about 2500 tons, or less than the average amount. Purchases by jobbers and consumers have been on a moderate scale, however, and the demand at this writing is of very ordinary character. Late dealings were at 20.60¢ @ 20.65¢, which prices seemed to have fairly reflected market value at the close of the week.

Pig Lead.—The market has remained almost stationary. New tariff proposals exerted a certain amount of sentimental influence, the bearing of which was in the direction of lower prices, but sellers have thus far made hardly any revision in their prices, and consumers are extremely indifferent. There is no difficulty in buying carload or larger lots at 3.40¢, delivery here this month or next. Bids above 3.30¢, the bullion quotation, are few and far between. In short, the market is looking rather weak and is positively dull at the present time.

Spelter.—There is hardly the snap to the demand that prevailed a week

ago, and the market is, if anything, a shade easier. A few carloads of special brands were placed here at about 4¢, and reports from primal markets had it that Western consumers have purchased there recently at full figures, or the basis of 3.80¢ @ 3.85¢, Eastern delivery, for ordinary Western brands. There is no evidence of any particular pressure to sell, but the relation of supply and demand is slightly abnormal, and the prices above quoted would seem to fairly reflect present market value for ordinary brands.

Antimony.—There has been fair jobbing movement at about former prices, otherwise the market remains flat, and prices are barely steady at 9½¢ @ 9½¢ quoted for Hallett's and 10½¢ @ 10½¢ for Cookson's.

Tin Plate.—The demand for spot goods has been small, and no difficulty was experienced in placing orders at former prices. For that matter, concessions were granted in several instances. Except for special sizes few contracts have been made for future deliveries and interest in all directions is momentarily very tame. Spot quotations are as follows: Coke Tins—Penlan grade, IC, 14 x 20, \$5.30; J. B. grade, do., \$5.35; Bessemer full weight, \$5.35; light weights, \$4.90 for 100 lb, \$4.80 for 95 lb, \$4.62½ for 90 lb. Siemens Steel scarce. Stamping Plates—Bessemer Steel, Coke finish, IC basis, \$5.60; Siemens Steel, IC basis, \$5.65; IX basis, \$6.75 @ \$6.80. Charcoals—Melyn grade, IC, \$6.35; Crosses, \$8; Allaway grade, IC, \$5.60; Crosses, \$6.75; Grange grade, IC, \$5.75; Crosses, \$6.85. Charcoal Ternes—Worcester, 14 x 20, scarce; do., 20 x 28, \$11.35; M. F., 14 x 20, \$7.35 @ \$7.37½; do., 20 x 28, \$14.75; Dean grade, 14 x 20, \$5.35; do., 20 x 28, \$10.50 @ \$10.60; D. R. D. grade, 14 x 20, \$5.15; do., 20 x 28, \$10.10; Alyn, 14 x 20, \$5.35; do., 20 x 28, \$10.50; Wasters—S. T. P. grade, 14 x 20, \$4.75; do., 20 x 28, \$9; Abercane grade, 14 x 20, \$4.60; do., 20 x 28, \$8.87½.

New York.

Office of *The Iron Age*, 96-102 Reade street, }
NEW YORK, December 6, 1893. }

Pig Iron.—Merchants and agents generally note a somewhat improved inquiry and a greater interest in the market, particularly as to the prices which may be fixed for next year's delivery. As yet, however, no advance is being asked by the majority of sellers, and a good deal of cheap Iron is being offered. Contracts for Cast Iron Pipe of some magnitude have been lately let at Washington and at Jersey City, and other work of a similar character involving somewhat large quantities is now or will be soon in the market. We quote: Northern brands, \$14 @ \$15 for No. 1; \$13 @ \$14.25 for No. 2; \$12.25 @ 12.50 for Gray Forge, at tide-water. Southern Iron, same delivery, \$13 @ \$14 for No. 1; \$12 @ \$13 for No. 2; \$11.50 @ \$12.25 for No. 3; \$11.75 @ \$12.25 for No. 2 Soft, and \$12.25 @ \$12.50 for No. 1 Soft. Gray Forge is \$11.25 @ \$12.

Spiegeleisen and Ferromanganese.—Importers are protesting against the change in the duty on Ferromanganese from \$6.72 to 22½% ad valorem on the ground that it represents an increase. On a valuation of £9/10, English works, the proposed duty would figure out about \$10.50, against the present rate of \$6.72. No business has been done

in foreign material, which we quote: Foreign Spiegeleisen, 10 % @ 12 %, \$21.50 @ \$22, and 20 %, \$25.50 @ \$26, on cars, Jersey City, and Ferromanganese, \$55 @ \$55.50.

Billets and Rods.—There is no business doing of any consequence. We quote nominally: Domestic Billets, \$20 @ \$22, and foreign Billets \$28 @ \$28.50, tidewater; domestic Wire Rods, \$27.25 @ \$28, and foreign Rods, \$39 @ \$39.50, tidewater.

Steel Rails.—The market for standard sections is exceedingly dull, nor is there any expectation that anything of consequence will be done in the Eastern market for some time to come. The price is \$24.80 at tidewater.

Track Material.—We quote as follows for small lots: Spikes, 1.75¢ @ 1.90¢; Fish Plates, 1.30¢ @ 1.50¢; Track Bolts, Square Nuts, 2.10¢ @ 2.40¢, and Hexagon Nuts, 2.30¢ @ 2.50¢, delivered. Concessions would be made for round lots.

Manufactured Iron and Steel.—Very little new business is coming up, and interest centers chiefly in guessing at what figures Western mills captured the last contracts. Very low offerings of Plates are being made to procure immediate specifications for Western mills who had large contracts deferred. We quote nominally: Beams up to 15 inch, 1.65¢ @ 2¢, 20-inch, 2¢ @ 2.25¢, for round lots; Angles, 1.60¢ @ 1.80¢; Universal Mill Plates, 1.60¢ @ 1.75¢; Tees, 2¢ @ 2.15¢; Channels, 1.65¢ @ 2¢, on dock. Steel Plates are 1.45¢ @ 1.60¢ for Tank; 1.65¢ @ 1.90¢ for Shell; \$1.90 @ 2.15¢ for Flange, and 2.30¢ @ 2.80¢ for Fire Box, on dock; Refined Bars are 1.45¢ @ 1.9¢, on dock, and Common 1.35¢ @ 1.50¢; Soft Steel Bars are 1.45¢ @ 1.70¢; Scrap Axles are quotable at 1.65¢ @ 2¢, delivered; Steel Axles, 1.65¢ @ 1.90¢, and Links and Pins, 1.65¢ @ 1.80¢; Steel Hoops, 1.70¢ @ 1.90¢, delivered; Cotton Ties, 70¢ @ 72½¢ @ 45 lb bundle, at mill.

F. B. Hawkins & Co. of 29 Broadway, and 70 Kilby street, Boston, announce that their F. B. Hawkins has withdrawn from the firm of Warren, Wood & Co., and that they shall conduct a business in Pig Iron, Coke, Cast Iron Water and Gas Pipe at the above address. Their leading specialty in Pig Iron will be the Allegheny, made by the Allegheny Iron Company of Iron Gate, Va., for whom they are exclusive selling agents north of Richmond, Va. The furnace, which was banked last May, is again in operation.

The Eclipse Bicycle Company of Beaver Falls, Pa., have recently increased their force of employees to some extent, and expect in the near future to give employment to about 400 men. This firm are bringing out a number of new wheels for the season of 1894 and expect their trade next year to be much larger than for this season.

Three torpedo boat "catchers" have been ordered by the British Admiralty from a firm of shipbuilders at Cowes, Isle of Wight. They are each to be 210 feet long, and capable of attaining a speed of 26 knots.

Fred. A. Beelen, Consul-General of Chili, announces the receipt of a cable advising him that the Chilean Mineral Exposition has been postponed until September, 1894.

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, December 6, 1893.

Pig Tin prices have averaged somewhat higher and the market has shown firm, although irregular tone. There was some depression early in the week under the influence of free selling, but later reaction took place, chiefly from livelier speculative interest and expected renewal of American demand. Between this and some improvement in consumptive demand, prices moved up about 20/ from the extreme lowest point. Better advices from the East also helped to stiffen the market. Sales were made at as high as £77. 5/ for prompts. Subsequent realizations caused a reaction and the market closed quiet at £76 10/ for prompt and £77. 10/ for three months' futures.

On prices of Merchant Bar Copper there has been an advance of about 15/, chiefly on speculative buying for American account, but helped to a certain extent by quite good purchases by home consumers. Latterly the market became irregular, being influenced by speculative realizations by speculators and freer selling by some dealers. Against this, however, was quite liberal buying of one and two months' futures, prompted by more favorable advices from New York and improved statistical position in Europe. Liberal deliveries of G. M. B. tend to check any great advance. Chili charters last half of November were about 600 tons. Sales of furnace material have been limited, and prices remain comparatively low. At the close, Merchant Bars were quoted at £43. 7/6 for prompts and £43. 17/6 for three months' futures. Best selected English quoted at £47.

In Tin Plate there has been hardly any business and the market remains flat. Prices are unchanged. Although makers appreciate the proposed reduction in the duty in the United States, they do not relish the ad valorem rate. Work has been suspended at the Waterloo works, Machen. Liverpool quotations for Plates were as follows:

1C Charcoal, Alloway grade.....	12/3 @ 12/9
1C Bessemer Steel, Coke finish.	11/3 @ 11/6
1C Siemens	11/6 @ 11/9
1C Coke, B. V. grade, 14 x 20.....	11/3 @ 11/6
Charcoal Terne, Dean grade.....	10/9 @ 11/

Pig Lead has been quiet, but the market is steady at £9. 10/ for soft Spanish.

Spelter has met with moderate sale and prices are steady at £17. 2/6 for ordinary Silesian.

There is more activity in some branches of the Iron and Steel market, but prices have not changed, except for warrants. Last dealings in warrants were at 43/8 @ 43/9 for Scotch, 35/7½ @ 35/9 for Cleveland, and 45/ for Hematite.

San Francisco News.

The items as to what the character of the proposed tariff may be do not, as they come along by telegraph, seem to excite any very great interest among the trade or the manufacturers, although the interests of the latter would be affected very materially. There is a general disgust among manufacturers generally at the tariff for revenue proposition, and perhaps it is because they deem a change to be inevitable that there is so much apathy on the subject among business men. Some time ago the manufacturers in iron and steel signed a petition asking Congress to take away the duty on coal, scrap, pig iron and ingot steel, and this is the general sense of the manufacturers in these lines over the coast. There are, to be sure, a few who for consistency sake are for the McKinley tariff or something like it, but these are in the minority. The proposition to leave a small duty on pig iron and take away so much of the duty on bar iron does not find favor among the manufacturers. The one to reduce tin plate to a duty of 1 cent per pound does. Fiscal considerations doubtless counsel leaving a cent a pound on tin plate. As it is not protective, our people think that it would be better to remove the duty altogether. Putting tin again on the free list is decidedly popular here. As to the general duties proposed on hardware, &c., they do not affect us specially, as we are not manufacturers. We do not produce iron ore to any extent, although we have mountains of it, so that putting it on the free list does not trouble us. The general sentiment would, however, be in favor of having it admitted free, to see if we could not import and work up ore from Mexico.

Trade keeps very quiet in every direction, and in hardware and metals as well as all else. The country trade did not get a good start this fall, and the leading houses will have, as a rule, to wait over till next year for the realization of hopes which did not bear fruit in this. The farmers feel poor; they have neither been paying up the storekeepers well, nor have they been buying largely of new goods. Collections are and have been very slow, and this after a dull year is especially discouraging. A gentleman well known to me, not, however, in the hardware trade, took out \$1300 in bills on last collection day, and as the result of his work returned with \$31. This may be looked upon as an extreme case, but it is not infrequent. Eastern bills, being in the shape of notes, have to be met in some way, and as coast bills are invariably on long time our coast merchants suffer. There have been very light arrivals of late by sea or rail. There are a great many clippers out, many due with large consignments of hardware, iron and nails, &c., and as they have been ordered they must perforce be delivered, whether trade is dull or not, but shipments by the Isthmus and by rail are becoming few and far between.

John Reis is now manager at Edith Furnace, Allegheny, Pa., E. D. Reis having resigned that position in order to devote all his time to Rosena Furnace, at New Castle.

W. T. Wells, of Hackensack, N. J., president of the Wells Rustless Iron Company, has purchased Crown Island, one of the most beautiful of those located in Lake George.

HARDWARE.

Condition of Trade.

THE volume of November business was certainly as large as could reasonably have been expected, and indicated a decided improvement in the general condition of trade. There continues to be a fair activity, though business still feels to a considerable degree the depression which has existed and is also restricted by the advance of the season, this being a time of the year when trade is usually quiet. Seasonable goods are moving freely, the demand being stimulated by the advent of cold weather, especially as many merchants deferred their purchases to a later date than usual. Holiday goods are also in request, but the demand is not as large as in more prosperous years. There is a good deal of inquiry by the large houses in regard to next season's orders and the disposition is shown to defer purchases. A good many orders are, however, being placed for shipment early in the year, and in some lines this class of business is referred to as nearly up to the normal volume. Up to the time when the Wilson tariff bill was announced there were evidences of a marked improvement in business and a much more confident tone than has characterized the market for some time, but the proposed reduction of duties has the effect of inducing an unsettled feeling, repressing trade, and leaving manufacturers and merchants in a state of not a little uncertainty. The prospect of a reduction in the tariff naturally makes the trade at large reluctant to purchase goods which they may be able to buy at lower figures in the near future, and there is a good deal of doubt as to the lines which will be thus affected and the extent to which lower prices will result. Manufacturers are also perplexed in the matter and in not a few lines are entirely at sea as to the effect which the proposed bill will have upon their interests, especially as it is not unlikely that some kinds of foreign Hardware which have not recently been sold to any extent in this country will be admitted in competition with American goods. The fact is that in not a few lines our manu-

facturers are not informed as to the European costs so as to figure definitely on the influence which the proposed bill would have upon their business. In many other lines, however, the manufacturers are aware of the disaster which the enactment of the proposed law would bring upon their business, and are naturally disposed to do little until they know the disposition which will be made of the bill. Opinions differ widely as to the prospect of its being enacted in the form submitted, many holding to the view that important modifications must be made in view of the injury which it would inflict on established industries. There is, however, general agreement that it will be for the good of the country to have the matter settled in one form or another at as early a date as possible, that the existing uncertainty may be removed and manufacturers and merchants be permitted to adjust themselves to the new conditions.

Chicago.

(By Telegraph.)

Trade shows some improvement as compared with last month, but it is still far below what it should be. It is estimated that sales are now from 30 to 40 per cent. below the customary volume of business at this season. The main demand is for seasonable and holiday goods, but general Hardware is steadily called for in small lots. The smallness of stocks in retailers' hands compels them to buy frequently, which is much to the annoyance of jobbers, who are obliged to break packages to meet the wants of such trade. Lead goods are lower, in sympathy with the decline in crude lead. Shot has been marked down to \$1.40 for small sizes, and \$1.65 for large sizes. Heavy Hardware jobbers have had an unusually heavy run of orders for sleigh stock, more than for several years past, caused by the abundance of snow throughout the Northwest and the prospect of a long sleigh season. In other respects Heavy Hardware has been less active.

St. Louis.

(By Telegraph.)

The demand continues to show a falling off in comparison with last year. In some lines an increased trade is noted. In the matter of repairs for Stoves and Stove Pipe Elbows an increased trade is noted. Shelf goods are moving rather slowly, while on the other hand holiday goods are

having an unusually heavy run. Barb Wire is dull and Wire Nails are selling fairly well, but prices are low. Tin Plates are dull and manufacturers are not pushing their plants very strong, and stocks are therefore not very heavy. Collections are excellent.

Boston.

BIGELOW & DOWSE.—The improvement noted in our last report still continues. Salesmen are sending in well assorted orders, and with a good volume of mail orders the jobbers are quite busy. Retailers in the country are keeping up their sales better than those in the cities. Stocks are light, and need frequent replenishing.

The low price now ruling for both Cut and Wire Nails is influencing many to place orders. Evidently some of the trade believe with the manufacturer who, after quoting a price he thinks is very low, says he does it "hoping it will not take many moons to bridge over the present peculiar condition of things." Our first ice has made a lively sale for Skates, and the late fall of snow has made great inroads on the stock of Sleds and Snow Shovels.

New Orleans.

A. BALDWIN & Co.—Business is still fairly active in this section of the country, although it shows a slight falling off in the past two weeks. People are evidently awaiting developments in the new year. Staples are being sold at such low prices that merchants are taking advantage of the present situation, thinking perhaps that the extreme bottom has been reached.

The movement in Barb Wire is somewhat sluggish, and the output shows considerable falling off the last season.

Orders for Shelf Hardware are coming in freely, which indicates some activity in the building trade.

Baltimore.

CARLIN & FULTON.—Considering the season, that it is too late for fall and too early for spring, the orders keep up remarkably well, indicating that stocks in the hands of the retail trade are very light throughout the entire country. We think a comparison with last year will show generally in this market for the month just ended an equal volume of business, and collections are as good as can be expected and no doubt up to the average. There are cases where indulgence has to be granted, but such has always been the case, no matter how prosperous the times.

For a long while the retailer has been in close touch with the consumer, and his orders have been mainly for goods needed for immediate consumption. This policy will undoubtedly continue for some time to come, which will give the country an opportunity to adjust itself to the new conditions arising

from the passage of any proposed tariff bill, without causing any great loss from depreciation of values of stocks on hand. This hard to mouth buying seems small, but as the requirements of this nation are immense, the aggregate of such business foots up by the end of a year large amounts, and the indebtedness of the buyer is kept at a minimum. From all reports we look for a fair, healthy trade during the coming year.

Portland, Ore.

CORBETT, FAILING & ROBERTSON.—We have nothing to report of an encouraging nature, either as to the present or future. In some sections of this territory it would seem that it would be better that the dealer should close his doors for the next eight months, after insuring stock, and not try to do any business. He certainly would be ahead on his expenses, and he cannot be in continuing his business. The only relief we can hope for is that the tide of immigration shall set in strong the coming spring. We have the country and climate; now we want farmers. There are enough mechanics and clerks—towns and cities are well abreast of the country. Large ranches are being thrown on the market, owing to the money stringency, and as they are subdivided there are now fine opportunities to secure homes.

The jobbing trade have large stocks of goods on their hands. Having expected a better season, they shipped freely via Cape Horn. Now, wishing to realize on same, they naturally are selling on a very close margin of profit, where the opportunity is open and the buyer good.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—We have now entered upon our winter operations in this latitude, and the season has opened with steady, severe cold and with considerable snow, and the indications are now for one of our old fashioned winters. The November business closed about as expected, both as to trade and collections. Toward the latter part of the month there probably was a larger falling off in cash receipts than anticipated, but there will still be considerable realized from collections on the proceeds of the crops. It is not expected that trade will be active for several months. Of course there will be some lines of holiday goods furnished by most jobbers that will be in demand to some extent, but the demand for them will be less than usual this year. The principal aim of jobbers just now is to get their outstanding claims into the best shape possible, and thus be able to enter on the new year's business in shape to handle it satisfactorily. The uncertain and very unsatisfactory situation of the tariff legislation at present is influencing trade unfavorably to some extent and is specially unfavorable to the wool interests, which are quite important on considerable of the territory tributary to St. Paul. There are several other causes, such as short crops in some sections and low prices generally, that contribute largely to the general feeling that trade will not be quite so active as usual during the early part of the coming year; still there will be a demand for considerable quantities of goods in all lines, and there will also be found more funds distributed throughout the country to pay for them than is generally supposed.

Omaha.

LEE-CLARKE-ANDRESEN HARDWARE COMPANY.—The past four weeks have witnessed little change affecting the distribution of Hardware in a jobbing way. It may be said, however, that such changes as have occurred have been, if anything, on the side of improvement. The reports of returning confidence in the East have had a beneficial effect on the situation here, and while any great activity in business is not expected this year, at least, still these signs of returning confidence can reasonably be interpreted to convey an assurance that business is gradually resuming its normal condition.

It is certain that for some time to come business will be conducted on conservative lines, until all traces of the late severe experience of the summer months have been effaced and forgotten. There is no indication in the trade, either on the part of jobbers or retailers, toward anticipating wants. Orders generally are for small lots of goods, but the frequency of these orders makes up in a large degree for the loss in size. The demand seems to be based entirely on the consuming disposition of the country.

Collections in the country tributary to this market continue to drag, and there is considerable room for improvement. A free movement of the corn crops would have a tendency to make money much more plentiful in the country, which would improve both trade and collections. In explanation of the situation it is asserted that farmers will not market their corn crops, as the price is too low and unsatisfactory; while it is also claimed that the denizens of the country are too busy just now with farm work, particularly corn husking, to devote any time to marketing their products. If these are the true reasons for slow collections just now, it is gratifying to know that they are not caused by unfavorable conditions prevailing.

Louisville.

W. B. BELKNAP & Co.—It is cheerful to note a general improvement in business. The November result shows an approximation to last year in many jobbing lines, according to the most reliable testimony of those houses which have survived and are in a position to take care of business offering. This does not mean that the aggregate volume is as large as last year, because many firms have gone out of business, consequently it is concentrated in fewer hands.

Prices are firm at present figures. There are some indications of scarcity of stock, more especially in raw material, and it would not be surprising if January should mark advances in the great staples. Of course anything like a heavy advance would immediately start many now idle machines to work, and the market might be quickly overstocked again, but there is a healthy demand based on the actual needs of consumers which is not to be put aside by new tariff bills or any other devices.

The financial situation has eased materially. First-class bonds are in good demand, are bringing full prices and are hard to get. Buyers are still extremely shy of anything except gilt edged securities and even of what used to be considered desirable stocks, while new enterprises find no favor at all. There is, of course, a great deal of settling up to be done between now and January, and many concerns will take advantage of the state of affairs in the condition of the public mind to

assign and settle at a reduction; but the general state of affairs is on the mend, undoubtedly. We look for a good business in the spring of 1894.

Cleveland.

THE W. BINGHAM COMPANY.—When the exceeding depression in trade for the past few months is taken into consideration, November has done remarkably well, and in comparison might be called good. Certain it is the percentage of decrease as compared with 1892 is very much less than any month since July last, and if the uncertainty of tariff legislation were removed we feel sure that trade would soon be back in its wonted channels. The cold and blizzard like weather of the past few days has brought many orders for winter goods, and Skates, Sleigh Bells, Foot Warmers, &c., have been in brisk demand, and have carried with them some orders for Shelf Hardware. The prices on general goods remain stationary, but lack of firmness in the staples of Wire and Nails has reflected somewhat upon other lines and caused some lack of confidence in the stability of prices. Orders for Wire Cloth, Poultry Netting, &c., are, however, being freely placed, the scarcity of those articles last season being an incentive to early purchase, which is, no doubt, a wise precaution, as the outlook indicates a still greater scarcity the coming year.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Trade during the last two weeks in November exceeded in volume the last two weeks of the preceding month. If we could rely upon a continuation of the same for each succeeding month we would naturally all be happy. We, however, think the outlook favorable for the balance of the year, as customers are now buying both seasonable and holiday goods freely. The recent cold weather has made seasonable goods temporarily active.

Skates have been in active demand, a larger number having been sold than customary for some years past. There has been a heavy demand for Sleds, especially one particular make manufactured in this locality, which has become very popular. Sleigh Bells have not been so freely called for for some years past as they have this season, and the Axe trade has been especially active.

Outside of Barb Wire and Wire Nails, prices remain without any change. The present price on the above named articles has evidently been reached by a reduction in wages, although at this price it is not likely to draw in very large orders for 1894 shipments at present, as it is a little in advance of immediate wants.

Collections remain without any material change.

Notes on Prices.

Wire Nails.—It is evident that the low prices ruling on Wire Nails have the effect of stimulating orders, and this influence, in connection with the general improvement in the tone of business, causes many merchants to purchase Wire Nails with more freedom than for some time past. Merchants are not, however, purchasing much beyond their early requirements, but the fact that stocks generally are depleted and broken increases somewhat the size of orders

which are being given. Many buyers, however, are still holding off, as they do not care to purchase at all freely at the present dull season and with the uncertainty which attends the future course of trade. Prices remain as at our last review, at \$1.15 to \$1.20 for carload lots at mill, and manufacturers are refusing to make concessions from the lower of these figures except in very special cases. Buyers are watching the market closely, and are preparing to place their orders in case there should be reason to anticipate an early turn in the market toward higher prices.

Chicago, by Telegraph.—All Wire Nail manufacturers report very large shipments for November. The Salem Wire Nail Company that month shipped 92,626 kegs from their Salem and Findlay mills, which is the heaviest month's product they ever turned out. December is expected to be a month of heavy shipments also. There are plenty of contracts to be filled, but there are also some sections of the country in which stocks were never so light at the beginning of the year, and from which orders are therefore anticipated in good quantities. Quotations for factory lots are continued at \$1.30, Chicago. Small lots are selling at \$1.35 from stock.

Cut Nails—We are unable to report any improvement in the Cut Nail market in the matter of prices, which remain as for several weeks past, at about 95 cents for carload lots at mill; this figure, however, being shaded to close buyers on good orders. There has been a fair activity considering the season and the condition of business in general, and the aggregate of sales during the past week or two has been fair. Small lots from store in New York are quoted regularly at \$1.20.

Chicago, by Telegraph.—The Cut Steel Nail trade is not so active as it has been, but manufacturers report a tolerably fair run of small orders, enabling them to keep in operation. Prices range from \$1.15 to \$1.20, according to the character of the order. Small lots from stock are quoted at \$1.25.

Barb Wire—Low prices continue to rule in the market for Barb Wire, but there has been no further decline during the past week. Quotations are on a basis of \$2.15 to \$2.20 for carload lots of Four-Point Galvanized at mill. The demand is only moderate. The low prices ruling, while not inducing liberal purchases from the trade at large, enable the manufacturers, however, to dispose of a larger quantity of Wire abroad than has heretofore been the case, inasmuch as they are now enabled to enter some markets which have been supplied from German mills.

Chicago, by Telegraph.—The year has now advanced to a point where orders for spring shipment of Barb Wire are beginning to make their appearance. Manufacturers of special brands are booking more or less business, and in-

quiries are reported for standard qualities. Manufacturers appear to be standing firmly at \$2.35 to \$2.40, Chicago, for Galvanized, and offers of heavy tonnage are stated to have been refused at a shade under the minimum quoted. Jobbers name \$2.55 for small lots from stock, but are receiving very little business, as most of it is being handled by manufacturers.

Plain Wire.—Plain Fence and Market Wires, which have for some time been declining in price, have now touched a point considerably below anything in the experience of the manufacturers. For example, round lots of No. 9 Black Fence Wire can be bought at \$1.40, with the usual advance of $\frac{1}{16}$ ¢ per pound for galvanizing f.o.b. vessel, New York, which of course means a correspondingly low figure at mill. A good deal of complaint is made by the manufacturers of the unsatisfactory volume of business even at the prices which are ruling. There is, however, an increase in the amount of Wire exported, as at ruling prices they are able to compete with German manufacturers. While the aggregate of this business is not as yet large, the opportunity to dispose of goods in markets which have been out of their reach is referred to by some of the manufacturers as an encouraging sign.

Cordage—The Cordage market is in substantially the same condition as for the past week or two, and the low prices recently referred to are still ruling. Reports in regard to the reorganization of the concerns connected with the National Cordage Company are current, but are not regarded by the trade as having any important or direct bearing on market values, even though coupled, as they are in some cases, with an intimation that an understanding as to price has been or will be reached by these and other manufacturers of Cordage. The present indications are that no serious attempt will soon be made by the manufacturers to agree as to production and prices with a view to controlling the market, as in the present condition of things this is not likely to be accomplished. Ruling prices are unquestionably low and leave but a meager margin of profit, and when an active demand sets in higher prices are likely to result.

Sad Irons.—The following net prices on the Sad Irons of Colebrookdale Iron Company, Pottstown, Pa., who are represented by Duncan K. Major, 103 Reade street, New York, are announced, terms 60 days or 2 per cent. discount or cash in ten days:

Crown Sad Irons:
No. 230. Plain Polished, \$8.40 per dozen sets.
No. 235. Nickel Plated, \$9 per dozen sets.
Extra Handles, \$1.25 per dozen.
Extra Stands, 35 cents per dozen.
Common Diamond Sad Irons, $2\frac{3}{4}$ cents per pound.
The XX Tailor Irons—wide face, 4 cents per pound.
The XX Tailor Irons—narrow face, 4 cents per pound.

The XX German Tailor Irons, 4 cents per pound.
New England Pressing Irons, 4 cents per pound.
Chinese Laundry Irons, 6 cents per pound.
Chinese Common Sad Irons, 4 cents per pound.

Shot—As a result of the decline in the prices of Lead, the following revised quotations on Shot are announced by the manufacturers under date December 4; terms, net 30 days, 2 per cent. discount for cash in 10 days:

Drop Shot up to B, 25-pound bag	.... \$1 40
Drop Shot " " 5-pound "	.... 35
Drop Shot B and larger, 25-pound bag	1.65
Buck and Chilled, 25-pound bag	1.65
Dust Shot, 25-pound bag	2.00
" " 5-pound "	45

In lots of 2000 pounds and upward, taken at one time, a discount of 5 cents per bag (25 pounds) will be allowed. A special discount of $2\frac{1}{2}$ per cent. will be given on lots of 1 ton and upward bought, invoiced and paid for at one time.

Ideal Fasteners.—The Ideal Storm Sash and Window Screen Fasteners, manufactured by C. H. Congdon, 643 St. Anthony avenue, St. Paul, Minn., and illustrated in *The Iron Age* November 23, 1893, are sold at \$2 per gross subject to a discount of 60 per cent.

Columbian Sash Lock.—The Columbian Sash Lock, manufactured by the Columbian Sash and Door Lock Company, Wauseon, Ohio, is sold at a discount of from 60 and 10 and 5 per cent. to 60 and 10 and 10 per cent. from the following lists:

No.	Per doz.
500, Ornamental Malleable Iron Bronzed	\$1.90
501, Ornamental Malleable Iron Cop- pered	2.25
502, Ornamental Malleable Iron bronzed. No. 14 Finish Lever and Catch	3.00
503, Ornamental Malleable Iron Pol- ished Electro Bronze Plated, No. 14 Finish	5.00
504, Ornamental Malleable Iron Pol- ished Nickel Plated	6.50
600, Ornamental Real Bronze Metal, No. 1 Finish	7.50
601, Ornamental Real Bronze Metal, No. 4 Finish	7.50
602, Ornamental Real Bronze Metal, No. 3 Finish	7.50

The foregoing list relates to the style of finish shown in Fig. 2 of the illustrated description in *The Iron Age*, November 23, 1893. The following list, which is subject to same discount as above, relates to the style of finish in Fig. 1 of the same description:

No.	P
450, Plain Iron Bronzed	\$1.40
451, " " Black Japan, Nickel Plated Lever and Catch	2.50
452, Plain Iron Bronzed, Nickel Plated Lever and Catch	2.75
453, Plain Iron Coppered	1.75
550, " Malleable Iron Bronzed	1.90
551, " " Japanned Nickel Plated Lever and Catch	3.00
552, Plain Malleable Iron Bronzed Bronze Metal Lever and Catch	3.00
553, Plain Malleable Iron Polished Electro Bronze Plated	5.50
554, Plain Malleable Iron Polished Nickel Plated	6.50
555, Plain Malleable Iron Polished Electro Copper Plated Antique	6.00
556, Plain Malleable Iron Bower-Barffed Finish	4.00
557, Plain Malleable Iron Polished Bower-Barffed Finish	5.50
650, Plain Real Bronze Metal, Polished Nos. 1 or 2 Finish	7.50

651, Plain Real Bronze Metal, Polished Nickel Plated.....	9.00
652, Plain Real Bronze Metal, Polished Antique Copper.....	8.00
653, Plain Real Bronze Metal, Polished Oxidized Silver.....	10.50
654, Plain Real Bronze Metal, Antique Brass.....	8.00
655, Plain Real Bronze Metal, Dead Brass.....	8.25

Curling Iron Heater.—The *Ætna* Curling Iron Heater, manufactured by Nicol & Co., 55 W. Washington street, Chicago, and illustrated in our issue of November 23, 1893, is sold at the following net prices:

No.	Per doz.
4. Without wire attachment.....	\$1.75
5. With wire attachment.....	2.25

Door Check.—The Beardsley Door Check, manufactured by the Beardsley & Mouat Mfg. Company, 234 Lake street, Chicago, and illustrated in *The Iron Age*, November 23, 1893, is sold at a discount of 25 per cent. from the following list:

No.	Per doz.
5. 8-inch, Bronzed Iron.....	\$ 8.00
16. 10-inch, Bronzed Iron.....	10.00
17. 8-inch, Bower-Barff.....	12.00
18. 10-inch, Bower-Barff.....	14.00
19. 8-inch, Old Copper, Bronze and Nickel-plated on Iron.....	18.00
20. 10-inch, Old Copper, Bronze and Nickel-plated on Iron.....	20.00
21. 8-inch, Genuine Bronze.....	24.00
22. 10-inch, Genuine Bronze.....	30.00
23. 8-inch, Old Copper, Antique Brass and Dark Bronze.....	30.00
24. 10-inch Old Copper, Antique Brass and Dark Bronze.....	36.00

Glass.—The impression prevails that whatever tariff legislation may be enacted will not go into effect before June, 1894, and if such should be the case the price of Window Glass, or the wages of workmen according to the scale signed, would not be directly effected by the tariff. It is not improbable, however, that the prospect of a reduction of tariff will somewhat depress prices on Glass. Authorities state that the reductions proposed by the Wilson tariff schedule vary from 28 to 37 per cent. on Window Glass, while others estimated it at 50 per cent. Glass factories continue starting up; at the present time there is reported the equivalent of 1044 pots in operation. Prices on American Window Glass continue low, and there seems to be a disposition to make private prices rather than open quotations. Plate Glass is quoted by local jobbers at from 60 and 10 and 5 to 70 per cent. discount, according to size of Glass. It is understood that the regular quotations on French Window Glass of 75 and 10 and 5 per cent. to 80 and 5 per cent. discount are shaded in some cases. There is a limited demand for all kinds of Glass.

The Parsee merchant, Mowranji Norasji Patuck, who is now in this country, contemplates forming an association on his return to India, with a view to establishing direct trade relations with the United States. He has found that many articles can be exported from this country to India in competition with English and German goods. Among these are Axes, Lawn Mowers, Refrigerators, small sized Ice Machines that can be operated by hand power, Iron Screens and Railings, Agricultural Implements, Shears, Typewriters, &c.

The W. Bingham Company's Catalogue.

THE W. BINGHAM COMPANY, Cleveland, Ohio, have just issued an 1894 catalogue, which is unique, especially in the matter of size, as it indicates a reaction from the extremely large proportions of representative jobbers' catalogues. It has been the aim of the company in the preparation of this volume to produce a book of moderate size which will be convenient for use and at the same time sufficiently large to illustrate their complete line of goods distinctly and comprehensively. The company are to be congratulated on the success of their effort, as the book, which is just being issued, is very convenient to handle and use, while it presents the very large variety of goods shown in it in a clear and satisfactory manner. The plan of the book was formulated by H. S. Blossom, the secretary of the company, but the compiling and the entire arranging of the work were under the supervision of Frank N. Cleland, a young man who has been in the employ of the firm for a number of years, and to whom credit is due for the successful manner in which the work has been accomplished. The catalogue is about 6½ x 9 inches in size, handsomely bound in cloth and leather, containing 1476 pages and weighing 5 pounds 10 ounces. The line of goods represented includes Hardware, Railway, Miners', Engineers', Architects', Machinists' and Tinnerns' Tools and Supplies, Table and Pocket Cutlery. A comprehensive and well arranged alphabetical index is given a place near the front of the book. The page preceding the index pages is devoted to facts about the city of Cleveland, touching upon its pre-eminent position, distinctive features, progress, shipping interests, its importance as a market and industrial center, &c. The quantity of matter, including cuts, descriptions and prices, condensed on each page, but admirably arranged, is noteworthy and will be appreciated by the trade. Distinctness has not been sacrificed, nor do the pages present a crowded appearance, but sufficient space has been allowed to give all cuts in suitable size, with complete list prices of the goods. Goods which can thus be shown to better advantage, such as Decorated Ware, labels of Axes, Adzes, Hatchets, &c., are printed in colors. The company are to be complimented upon the results of their enterprise and skill in producing so complete, convenient and acceptable a book. The catalogue is destined to find favor with their customers, each of whom, it is stated, is entitled to one copy free of charge. The company's two-page advertisement in this issue contains a full size illustration of the book, and some of our readers who desire a handy and comprehensive catalogue will be interested in the announcement that a few extra copies are obtainable at \$10 each.

A Well Organized Business.

BY VIATOR.

ON A THANKSGIVING DAY, several years ago, E. C. Simmons entered a car on the New York, New Haven & Hartford Railroad and shared my seat with me. Our destination was New York, so I had the pleasure of his company for an hour and a half. We talked of home, Hardware and religion. The topic of home appeared to be his favorite. He talked of his children, and appeared to be specially delighted with their progress in music, &c. After the social topic he produced a statement, received that morning, prepared by one of his trusted lieutenants, showing the condition of his business on November 22, three days prior to the receipt thereof. The statement contained the following information:

- Total sales on November 21.
- Total sales on November 21 of preceding year.
- Gain of business,
- Estimated profits on sales of November 21.
- Estimated stock on hand, November 21.
- Estimated purchases on November 21.
- Amount of insurance in force.
- Total expenses for that day.
- Amount of money received.
- Amounts of money paid out.
- Balance in banks.
- Number of men on pay roll, wholesale department.
- Number of men on pay roll, retail department.
- Number of men on pay roll at large, hustling department.
- So a sheet of paper about 6 x 8 inches gave the general in command:
 1. Strength of his army in active service.
 2. The value of stores.
 3. The condition of the treasury.
 4. The captive dollars, captured on that day.

From this concise information he could direct the policy to be pursued, in a telegram of from 10 to 20 words, from a distance however remote.

Such a statement, I was informed, is placed on his desk every day when at home, or sent to him daily when abroad.

One day I received an urgent telegram calling me home. My train was to start at 10 a.m. As I had some business to transact with the Simmons Hardware Company I proceeded to their establishment, reaching there at 8.20 a.m., and found the buyer with whom I was to transact my business at his post. While conversing with this gentleman I heard a familiar voice bidding me good morning. Upon turning about I found that the greeting emanated from a voice under a straw hat. It was in the winter, at 8.30 a.m. It was E. C. Simmons. When I ventured the remark that it was rather early for him to be about, he said something about birds and worms. After these few words the stenographer at his side was busy exercising his abbreviating methods. In the meantime the buyer had the stock taken of the goods I had offered them, my order was made out, and I left the establishment at 9 o'clock, with ample time for my train.

Mr. Pilcher, the vice-president of the company, who has been connected with the concern in the capacity ranging from an office boy to the present position, delights to speak of his chief

as an organizer and judge of men. He said that Mr. Simmons would not hesitate to ask for his resignation should he find that his department was not conducted in accordance with the rules and policies of the establishment. In speaking of the organization of the Simmons Hardware Company in relation to their employees, Mr. Pilcher stated that every man was expected to attend strictly and exclusively to business and that there was no time for play. To illustrate this point Mr. Pilcher suggested that I accompany him to a department on the second floor, where we could observe some 30 men without being seen by them, and if I could detect a single employee not at his post and at work he would pay for a dinner. Based upon my observations in many business houses, visions of pheasants and that part of the snipe which is served on toast appeared. I was sure of that dinner, but—well, I did not get it.

On one visit I met Colonel Eshleman of Stauffer, Eshleman & Co., New Orleans, in St. Louis. The Colonel had heard of Simmons even in regions where rice grows in abundance, where black birds are the delight of the small boy, and where the cooking of okra soup is reduced to a science, so he wanted to see his concern. I introduced the Colonel to Mr. Morton, the able treasurer of the company, who gave us a very cordial reception, after which Mr. Morton summoned one of his head men and instructed him to take us from cellar to garret, and authorized him to answer any question as to the manner and system the machine was operated. The Colonel, who is the head of a colossus down in Louisiana, lubricated with considerably over \$1,000,000, was very forcibly impressed and left the establishment with a series of resolutions to be offered, moved and seconded upon his return to New Orleans.

Semi-Centennial.

THE firm of W. H. & G. W. Allen, Hardware merchants, located at 113 and 115 Market street, and 104 Church street, Philadelphia, celebrated the fiftieth anniversary of the founding of their house by a dinner given to their employees at the Art Club on the 23d ult.

The occasion was one that gave great pleasure to the firm as well as to their guests, for the well deserved reputation of the cuisine of the Art Club was fully maintained by the well prepared and promptly served viands making up the eight-course dinner.

The history of the house has been rather unique in several particulars. It was founded by W. H. Allen in 1843, before he attained his majority, and during the half century they have never moved from their original location, only growing in width on their Market street front, also in depth, now reaching to Church street in the rear.

In 1849 G. W. Allen was received as a member of the firm, and in 1875 and 1877 respectively, H. F. Chorley and J. D. Barr, both having learned their trade with the house, were taken into partnership, these four constituting the present firm.

One peculiarity is that, except for a period of four months, they have never employed traveling salesmen, and yet their record is that during the year 1892 they handled more goods than in any previous year; 1891 and 1890 following next in quantity, and from the present data, 1893, in spite of the universal depression in trade, will surpass all former ones.

One other peculiarity is that during the 50 years they have never lost a partner from any cause whatever, a record rarely equaled. Passing through all the paucis and financial disasters

occurring, they have never defaulted in payment or needed extension.

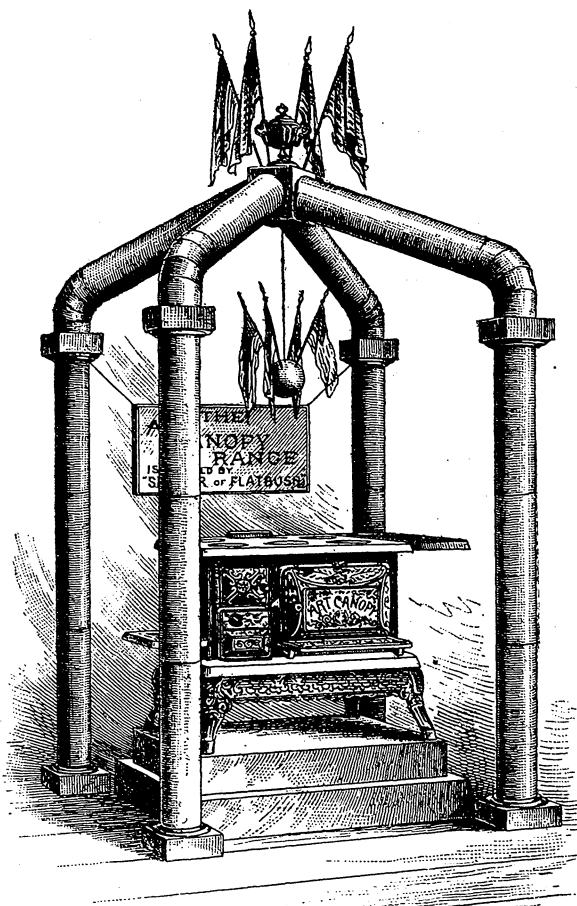
From the facts that they have remained so long in one place, and the non-use of the modern means of selling goods, many might conclude that the firm was a fossil and the members old fogies, but other houses who come in competition with them for business have a wholesale respect for their ability to secure and to hold the trade competed for.

Donations to Fairs.

OUR READERS are familiar with the annoyance to which merchants are subjected in connection with requests for donations for fairs given in aid of charitable societies. We give herewith an account of the method adopted by an enterprising house, which is referred to as rendering substantial assistance to the

galvanized iron, the latter being ornamented with brass plated stove pipe collars. The four pipes were held together in the center by inserting the ends in a galvanized iron box with wooden top and bottom. This, in turn, was surmounted by a large stove ornament encircled by American flags placed in holes in the wooden top of the box. From the lower side of the box a wooden ball was suspended, in which were small American flags. The pavilion was also draped with bunting, but not so shown in the cut. Hung from and between the two rear columns was a sign, neatly framed, on which was lettering announcing that the Range in question is sold by "Snyder of Flatbush," their usual firm designation in their advertisements.

One of the conditions of the donation was that the Range should be drawn for at 10 cents a chance. The firm



An Exhibit at a Fair.

fair, while at the same time they derived considerable benefit from it through the advertising which was secured.

J. J. Snyder & Son of Flatbush, L. I., were recently requested to contribute toward a fair held by one of the local churches, and set to work to devise some method by which the donation could be turned to their profit. As it was the beginning of the stove season and a proper time to bring such goods to the notice of the public, they presented an Art Canopy Range, one of the best they had in stock, and secured the privilege of mounting it to the best possible advantage. This was done as shown in the accompanying illustration by placing it on a platform in a conspicuous part of the hall in which the fair was to be held, the platform being covered with bright red and canary colored cheese cloth. Above and around the Range a pavilion was constructed of Russia iron stove pipe and elbows, with bases and capitals of

furnished cards as follows, with testimonials printed on the back:

CHANCES, NOS
IN THE DRAWING FOR THE
"ART CANOPY" RANGE
AT THE FAIR OF THE
Holy Cross Cath. Church,
IN THE TOWN HALL,
SEPTEMBER 4th to 16th, 1893.

The trifling cost induced almost every person who visited the fair to invest at least 10 cents, and thus several hundred testimonials of the Range given by residents were carefully carried to every section of the town. Although there were many articles on exhibition of tenfold greater value, nothing attracted more attention, and from the comments which the firm afterward heard they consider it the best advertising hit they ever made.

Bicycle Prices for 1894.

THE QUESTION as to what the list prices of the standard makes of Bicycles during the next season will be is one of much interest to the trade. The makers as a general rule are reticent on the subject, and are apparently deferring announcements until they find what policy will be pursued by their competitors. The effect of this uncertainty is being felt to a certain extent on trade in this line. We are, however, authorized by the Overman Wheel Company, Chicopee Falls, Mass., to state that the Victor Wheels, 1894 pattern, manufactured by them, will be listed at \$125.

We are also advised by E. C. Stearns & Co., Syracuse, N. Y., that the price of their Stearns Wheel for 1894 will be \$150. Referring to this announcement they say:

With but a few exceptions there has been a delay on the part of the manufacturers generally to formally set aside the rumors that the next month or two would see a reduction in the former prices of the standard machines. Buyers of Bicycles are left in the dark, while orders wait a hint. It seems to us that the time has now arrived for the manufacturer to take the public into his confidence and remove the feeling of uncertainty as to what next year's figures will be by coming out and definitely announcing his list prices. Not only would it restore confidence in the directions in which the maintenance of certain prices cuts a large figure, but it would give the dealers an opportunity to plan further ahead and thus be beneficial to maker and dealer alike.

In common with our competitors we are aware to the last cent the cost of building and marketing our wheels. It has never been our aim since we first embarked in the industry to see how cheaply we could build a Bicycle. On the contrary, our goal has been to produce a wheel embodying in its workmanship, its style, its capacity and its intrinsic value the full worth of the money at which it is sold. We are far from unmindful of the competition which we encounter in the open market; but we recognize that the maintenance of our reputation in the Bicycle business rests primarily on the excellence of our wheels. Therefore, we cannot with justice to ourselves, or without sacrifice to the quality which we wish to continue, offer the Stearns at a less list than \$150.

The \$150 list is founded on the ascertained cost, and as "self preservation is the first law of nature," it seems to us that any reduction in the list would naturally be at a sacrifice of quality that the wheelmen would not ask. The general adoption of a lower list by the manufacturers, while at first it might be considered a blessing, would in the end prove exactly the opposite. We want to feel that our price is such that we can afford to use in our wheels everything that is best, everything that will tend to increase the excellence of the Bicycle.

All things considered, therefore, there is every reason why we should announce and advocate the \$150 list for high grade wheels.

THE TWO-PAGE ADVERTISEMENT of the Covert Mfg. Company, West Troy, N. Y., calls attention, it will be observed, to their Soldering Irons and their Pants Stretcher. They allude especially to their improved facilities for manufacturing their Adjustable

Soldering Copper Irons, and call attention to the advantages which they possess over other goods. The particular features of their Pants Stretcher are also described.

Trade Items.

THE large establishment of the Paddock-Hawley Iron Company, 806 to 816 North Main street, St. Louis, was destroyed by fire early on the morning of the 23d ult. The fire raged for over three hours. Most of the engines in the city were called out. Smoke at first prevented the location of the fire and this gave it much headway. The origin of the fire is unknown, but it is supposed to have started in the engine room. Almost the entire structure was burned to the ground. The efforts of the firemen, however, prevented the fire from spreading to adjoining property. The damage is estimated at from \$150,000 to \$200,000.

BLAIR MFG. COMPANY, Springfield, Mass., have purchased of Farnsworth & Co., San Francisco, Cal., their California Lawn Sprinkler, which they will hereafter manufacture in connection with their Lawn Mowers and other lawn specialties.

J. FRANK GREENE & Co., manufacturer of Leather Specialties, 278 Water street, New York, have for years made a study of working up leather into a multitude of forms, so as to leave but a minimum of waste, at the same time using from each skin only what is best adapted for the special purpose for which it is required. This permits, they advise us, of supplying minor leather parts to manufacturers at a much reduced cost. Manufacturing as they do a very diversified line from this class of materials, they have in years accumulated much original and special machinery for the manipulation of leather, not possible with those having a limited use for it. Among other things, they make Knapsacks, Toilet Sets, Strops of many kinds, including Reaping Machine Strops, Dog Collars, Links for Belts, Washers for any purpose, &c. A feature of the Washers they make is that being cut with knives instead of dies the edges, inside and out, are parallel, instead of beveled, as when compressed by being cut under dies.

R. CHRISTENSEN, 90 Chambers street, New York, dealer in Cabinet and General Hardware, has made it a custom for years at this season to handle a moderate line of holiday goods, suitable for this class of trade. At present he has in stock an assortment of Aluminum Goods, embracing Match Safes and numberless small wares, fancy Clocks, Cigar Boxes, Cigar Holders, Mantel Ornaments, Austrian Vases, Smokers' Sets, &c.

CHARLES ASHLEY has disposed of his Hardware business at Ogdensburg, N. Y., to the Ashley Hardware & Iron Company, who have been duly organized under the laws of the State. Henry H. Bosworth is the manager of the company and Egbert N. Burt secretary and treasurer. Mr. Ashley's business career, which has been a very successful one, extends over a period of 43 years. He commenced business in 1850 in a small store in Ogdensburg. The store was 36 feet long and 20 feet wide and was about as large as the average town store at that time. In 1855 Mr. Ashley removed to new quarters, which he occupied for six years, when the requirements of his business having outgrown his facilities he removed again to a still more commodious store. Mr. Ashley occupied this store until 1870, when in consequence of changes which were necessary he purchased the site of his present business block on Ford

street. It was at that time comparatively outside the business limits of the town, but it was Mr. Ashley's judgment that men and not location made business. He built his present store in 1870 and 1871. The business occupies the entire building, which is 30 x 80 feet, with four floors. There are also four warehouses and an oil storage house. Henry H. Bosworth, the manager of the new company, has been connected with Mr. Ashley for 33 years, and Mr. Burt, the secretary and treasurer, for 21 years. The officers of the company are thus qualified by long experience to conduct the business energetically and successfully. Mr. Ashley will still be identified with the house and will extend to it all the support and assistance in his power; but desiring to be released from the burden of the business, he will not be so actively connected with it as heretofore. He is to be congratulated on the success which he has achieved and the high esteem in which he is held.

THE MUSSEY STONE COMPANY, Cuyahoga Building, Cleveland, Ohio, announce that they have just completed the erection of a Scythe Stone factory, and are now prepared to furnish promptly all the well known patterns of Western Scythe Stones, in addition to their full line of Grindstones of all sizes and Grits, mounted Grindstones, &c., at the lowest market quotations.

THE TRADE will observe the advertisement of George A. Waller, Seneca Falls, N. Y., in which he illustrates the Arctic Ice Dogs, which are designed to secure safe footing in walking on ice. Illustrations are given showing the construction and use of the Ice Dogs, which are made in two sizes, for ladies and gentlemen respectively. It is stated that the method of adjustment adapts them equally well to both shoes and rubbers.

Lee Clarke-Andreesen Hardware Company's Catalogue.

LEE-CLARKE-ANDREESEN HARDWARE COMPANY, Omaha, Neb., have just issued a handsome catalogue of 1012 pages, substantially bound in cloth and leather. It is printed on paper of excellent quality, fully illustrated, with descriptions and list prices. Each page is encircled with blue lines, adding much to the appearance of the book; and such goods as Axes, Hatchets, &c., have the labels reproduced in colors. For convenience the goods are arranged in departments, as follows:

Mechanics' and Edge Tools.....	1 to 148
Builders' Hardware.....	149 to 423
Farming Tools, Harness and Miscellaneous Hardware.....	423 to 700
Pocket and Table Cutlery, Razors, Shears and Silver Plated Ware.....	701 to 804
Bicycles, Tricycles, Velocipedes, Boys' Wagons, Sleds and Childrens' Carriages.....	805 to 823
Granite Iron Ware, Pearl Agate Ware, Pieced, Stamped, Galvanized and Japanned Tinware, Tinned Trimmings and Stock.....	823 to 888
Tinners' Tools and Machines.....	889 to 904
Arms and Ammunition, General Sporting Goods.....	905 to 1012

A well arranged index is placed immediately after the list of departments at the front of the book. Addressing the trade, the company remark that the increasing magnitude of their business, the large and varied stock they carry and their facilities for rapidly handling orders enable them to give to their customers the lowest market prices and quick shipment.

Price-Lists, Circulars, &c.

READING HARDWARE COMPANY, Reading, Pa., and 81 Reade street, New York: Supplement No. 4 to their 1891 catalogue. This is a book of 54 pages containing full size illustrations of a variety of new goods in genuine bronze and also a new line of fine Locks with flat and rabbeted fronts, for French windows, closets and doors having narrow stiles. The new patterns in solid bronze metal include complete lines of trimmings for Vassar and bit key Locks in scroll and circular fluted patterns. Eulalia designs and circular fluted door and window trimmings in wrought bronze are also shown. In addition to the supplement they publish an attractive 12-page pamphlet of iron goods in Columbian design. These goods are antique copper plated, which, the company state, is an entirely new method of finishing iron goods, requiring special patterns to obtain the desired results. This new finish is claimed to be very durable, and is referred to as presenting an appearance which closely resembles genuine bronze. The line of Columbian iron goods is limited to interior trimmings only. It comprises several Lock sets for inside doors, including sliding door Locks and Escutcheons, Door and Shutter Butts and a variety of small goods.

THE METALLIC WINDOW SCREEN MFG. COMPANY, 465 Washington street, Boston, Mass.: Fine Window Screens and Screen Doors. The Screens are made entirely of metal, the frame being of steel $\frac{3}{16}$ inch thick and $\frac{1}{2}$ to $\frac{5}{8}$ inch wide, according to size. The wires are soldered directly to the frames, so that when finished every part is soldered, brazed or welded. The Window Screen slides in guides, and for doors the Screens are set in a wood frame in suitable sized panels.

COLLINSVILLE BELL COMPANY, Collinsville, Ill.: Stock Bells and O. B. Wilson's Hill's Pattern Hog Rings and Ringers. List prices are given of O. B. Wilson's Stock Bells and Blum's Kentucky Durham Bells. Chime Bells No. 1, set of four for sheep, and No. 2, set of four for cattle, are also listed. This line of goods is thus facetiously referred to:

It has been discovered that wild animals will not disturb stock that are provided with chime bells, and that cattle cannot be stampeded that wear them. To meet this new demand for our goods, we take Nos. 1, 3, 5 and 8 of the musical octave and put them in perfect accord so that any two, three or all four will harmonize. Travelers in Switzerland are enchanted by the beautiful effect of these bells worn by stock in the mountains there. Our own pastoral districts may be made just as enchanting by the tinkling of the bells.

COLEBROOKDALE IRON COMPANY, Pottstown, Pa., with New York office 103 Reade street, in charge of Duncan K. Major: Colebrookdale Tailor and Sad Irons. An illustrated catalogue for 1894 shows Crown Sad Irons, common Sad Irons, Tailor Irons, wide and narrow faces; German Tailor Iron, New England Pressing Iron, Chinese Laundry Iron and Chinese common Sad Iron.

THE NORTHERN REFRIGERATOR COMPANY, Grand Rapids, Mich.: Hardwood Glacier Refrigerators. An illustrated catalogue and price-list shows Glacier Cold Dry Refrigerators, Grocers', Sideboard and Apartment Refrigerators, Ice Chests, &c., in different styles and sizes. Samples of wool felt and charcoal sheathing, as used in the Refrigerators, are inserted as pages in the catalogue. Attention is directed to their new metallic ice rack, air tight lock, and the new style of carvings in the Empire or Laurel Wreath

design; also the addition of a line of Refrigerators with porcelain ice tanks.

PORTLAND TINWARE COMPANY, 100 Cross street, Portland, Maine: Pieced Tinware. A price-list is issued by the company of Pieced Tinware, which they state is made from bright charcoal plates of full weight. A separate sheet illustrates the Maine Creamery Can, in which a faucet is set 1 inch from the bottom, so as not to disturb the sediment when drawing off the milk and cream. In addition to manufacturing the foregoing goods, the company job Stamp and Japanned Ware, Ironware, Wire goods, Agate Ware, 5 and 10-cent goods, Wooden Ware, Trimmings, &c.

EDWARD MILLER & Co., 10-12 College place, New York; 63 Pearl street, Boston, and Meriden, Conn.: The Miller Lamp. An illustrated catalogue and price-list shows the Miller Lamp in piano, banquet and parlor styles; Rochester Study Lamp, hanging, library, hall, desk and pulpit Lamps, Chandeliers and Bracket Lamps and Miller Oil Heaters.

SIMMONS HARDWARE COMPANY, St. Louis, Mo.: Guns, Pistols, Sporting Goods, also leading foreign Guns. A catalogue of some 130 pages illustrates and describes, with prices, Guns, Rifles, Revolvers, Ammunition, Gun Implements, Calls, Hunting Clothing, Boots and Shoes, Traps and Pigeons, Boxing Gloves, Footballs, &c. Attention is called to 1894 models of Bicycles, catalogue and prices of which will be sent to dealers upon application.

THE ADAMS & WESTLAKE COMPANY, Chicago: Brass Bedsteads. The company issue a supplement to their No. 5 catalogue showing a large line of Brass Bedsteads, with prices and descriptions. A smaller pamphlet calls attention to a medal awarded by the World's Columbian Exposition for superiority of construction and excellence of finish and calls attention to some advantages and the care of Brass Beds.

SIDNEY SHEPARD & Co., Buffalo, N. Y.: The Buffalo Dampener Clip. The company send a small pamphlet illustrating and describing the Clip, with prices for the Clip with wood and metal handles, from 4 to 7 inches. Two full page humorous illustrations add attractiveness to the pamphlet.

NOVELTY WOOD WORKS, F. E. Levanseler, proprietor, Sturgis, Mich.: Improved Step Ladder Chairs, and furniture specialties. An illustrated price-list shows Step Ladder Chairs in a variety of patterns and upholstery. The goods are made of elm finished in antique to closely resemble oak, also of sycamore finished to resemble cherry or mahogany. Every chair, it is remarked, has four steel wire locks to prevent the sides from pulling away from the steps. Unless otherwise ordered they are shipped tied in pairs at the consignee's risk of damage.

It Is Reported—

That Herman & Son, Hardware dealers, were burned out in a fire at Albia, Iowa, November 17.

That in a large fire at Hamilton, Ont., on the 22d ult., the Hardware stock of Peter Bertram was almost totally destroyed. Loss, about \$20,000; insurance, \$8000.

That W. L. Snow, plumber and dealer in Stoves, West Somerville, Mass., will add a line of Hardware to his business.

That S. B. Spencer's Hardware store, at Maiden Rock, Wis., was entered by burglars on the 18th ult. Thirty Pocket Knives, two Revolvers and a lot of Table Cutlery were carried off.

That the Hardware store of J. E. Phillips, Porterville, N. Y., was burned out recently.

That the Hardware store of A. Scheff, 462 St. Clair street, Cleveland, Ohio, was entered by thieves on the 18th ult. The cash drawers were stripped of their contents and a large quantity of Hardware taken.

That Laughlin & Brown's Hardware store, at McComb, Ohio, was robbed on the 22d ult.

That the foundations for Charles E. Faeth's new wholesale Hardware store, at Sioux, City, Iowa, have been completed, and a large force of men have commenced work on the building proper.

That G. E. Piper has bought the Hardware stock of A. M. Smith, Silver Springs, N. Y.

That H. D. Blanchard of Boston, Mass., will on January 1 open a Hardware store at Vergennes, Vt.

That the Hardware store of W. C. Fluke, Clayton, Mich., was recently robbed. This is the second burglary within a year.

That W. R. Batley's Hardware store, at Hearne, Texas, was burned out on the 23d ult.

That the Hardware firm of Atchison & Knowlton, Newton, Kan., have been dissolved. T. B. Atchison will continue the business.

That McClure & Co., in the Hardware business at Buffalo, N. Y., have sold out.

That the Hardware and Tin firm of Schick & Bridanstein, Mansfield, Ohio, have dissolved partnership.

That O. P. Olson has opened a Hardware store at Ulen, Minn.

That P. Martinson & Son, Hardware merchants, Lake Park, Minn., have dissolved partnership.

That Heins, Rich & Co., in the Hardware business at Renville, Minn., have been succeeded by Heins & Co.

That M. I. Crosby's Hardware store, at Baldwin, Kan., was burned out on the 19th ult. Loss, \$1500; insurance, \$500.

That J. F. Johnston has sold out his business interests in the Hardware firm of Johnston & Farrar, London, Ohio, to his partner, Colburn W. Farrar. Mr. Johnston is the Mayor of London.

That G. A. Taylor has disposed of his Hardware business at Portland, Ore., on account of ill health.

That Wm. Haberman has bought the Hardware stock of I. M. Lyman, Concord, Neb.

That M. Quinlan and H. S. Latham have opened a Hardware and Tin store at Gray's Lake, Ill.

That the store of the Fort Collins Hardware Company, Fort Collins, Col., was entered by burglars on the 20th ult.

That the Hardware store of A. L. Mills, Hartford, Conn., was entered by burglars on the 24th ult. About \$100 worth of goods were stolen.

That in a fire at Covington, Pa., the Hardware store of J. L. Kiff was destroyed.

That burglars entered L. H. Kurtz's Hardware store, Des Moines, Iowa, on the 19th ult. and blew open the safe. They secured \$55 in money and some valuable papers, some of them negotiable.

That Warren M. King has sold his interest in the Hardware firm of Caruth & Co., Orange, Mass. Fred. P.

Carruth will continue the business alone.

That the Hardware store of James Clifford, at Lenox, Mass was burglarized on the 27th ult.

Paints and Colors.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

The market is in a somewhat nervous condition, and business all along the line is of extremely conservative type. In some departments affairs are considerably disturbed by the uncertainties connected with the new tariff bill, and it is next to impossible to secure orders for the lines of goods thus affected with a saving duty clause wholly in the buyers' favor. Next in significance is the erratic condition of White Lead, due partly to prospective tariff legislation and in a measure to growing aggressive attitude of producers not connected with the National Lead Company. Besides these influences is the upward turn latterly in price of Linseed Oil that has more or less effect upon goods into the composition of which the Oil enters prominently as an ingredient. The most severe contention, however, is dullness of regular trade nearly all along the line and irritating slowness of collections. Hope of better things later on is not abandoned, but all signs indicate that the conservative policy among buyers is extremely popular.

White Lead.—Officials of the National Lead Company state that no changes have been made in their list prices and assert that they are making no direct or indirect concessions in this market. It is an open secret, however, that jobbers are selling small quantities at a liberal shading from these figures. Outside corrodors seem to be gradually becoming more aggressive and have made some bold moves since the publication of the proposed new tariff. They have confined their movements chiefly to Dry Lead, which is offered at 5¢ here and ¼¢ cheaper at Western points, where the contest with the combined corrodors is keenest. The outcome is problematical and shrouded in so much uncertainty that buyers take only such stock as they may be in immediate need of. This leaves the market in a dull and rather debilitated condition.

Red Lead and Litharge.—There is little doing in either pigment of foreign manufacture, since near future wants of the large consumers have been well provided for, while tariff uncertainties check further forward contracts. However, hardly any concession from late lowest prices is made, and the tone of the market is about the same as it was a week ago. Domestic sorts are without change in price and meet with very slow sale at the moment.

Orange Mineral.—French has been selling to a remarkably fair extent, but the dealings were chiefly in small lots for early delivery. The movement, however, served to keep prices quite steady. Interest in future shipments is subdued by the tariff uncertainties. Domestic brands are almost neglected and prices remain quite nominal.

Zincs.—Comparatively little new business in American Oxide has been effected, and the market at present shows rather slack tone. The ordinary canvass for orders would indicate that some producers are not as well off as could be desired in the matter of contracts booked, and, while the recently revised list covers the popular quota-

tions, concessions are not infrequent when really desirable orders come up for competition.

Colors, &c.—There is not a new feature in the market. Sales are slow, and only modest orders of the most pronounced type are being put through for future delivery. Prices are slightly uneven, as usual, on a slow market, but show no radical change. In ready mixed Paints, metallic Paints, &c., nothing new has transpired.

Oils and Turpentine.

With few exceptions the market remains in a very spiritless condition and the surroundings afford little hope for an early change for the better. In the departments in which export movement frequently cuts a prominent figure there is hardly any interest manifested by foreign buyers at the present time. In no line does there appear to be speculative tendency. As for the regular home trade movement, the best that can be said is that it is very moderate and hardly up to average value for the season. Movements in prices have been few and generally within very narrow range.

Linseed Oil.—The advance in prices of local brands made last week has been closely adhered to and the out of town crushers, as far as can be learned, make no concession from their prior advance. The market would thus appear to be quite firm at 42¢ for city and 40¢ for out of town brands of raw Oil made from American seed. Dealings have been moderate since the advance and, while looking quite firm, the market is by no means spirited. The strength of the market is due in a good measure to the late advance in cost of raw material.

Cotton Seed Oils.—Under the influence of quite heavy receipts and only moderate demand prices have ruled rather weak, and the market is at present in rather poor shape, since the lower range of values has stimulated business to a moderate extent only. Late sales were at 28¢ @ 29¢ for prime quality Crude, 35¢ for prime Summer Yellow, and corresponding prices for other varieties.

Lard Oil.—For strictly prime city-made Oil the common quotation is 75¢ and ordinary jobbing lots can doubtless be secured at that price. In any event the demand is no freer than the offering, while purchases of other than small lots have been strictly the exception during the past week or ten days. The tendency of the market for raw material is suggestive of lower prices for Oil, rather than any considerable advance in the immediate future.

Fish Oils.—Somewhat more interest has been manifested in crude Menhaden Oil, but buyers have purchased sparingly, and thus far there is no change in prices. Crude Sperm and crude Whale Oils have remained quiet and unchanged. The pressed and bleached products have met with fair sale in a jobbing way, chiefly at old prices. Cod Oil is a shade easier, with 40¢ now apparently a stiff price for wholesale quantities.

Spirits Turpentine.—The demand at this point has been moderate, and Southern advices have almost invariably reported slow trade there. Supplies have not increased greatly at first hands, but had sufficient weight to weaken prices off to 29½¢ for regular and 30¢ for machine barrels.

Miller Oil Heater.

Edward Miller & Co., 10-12 College place, New York, and Meriden, Conn., are putting on the market a series of oil heaters, one of which is shown in Fig. 1. The Miller lamp, which is used, has

two flame spreaders, one particularly adapted for heating purposes and one for lighting, although either can be used for the stove. The lamp is provided with an aluminum indicator, which will not corrode, for showing when the lamp is full. The lamp has a simple wicking and adjusting device, and no chimney is used with the heater, resulting in greater radiating power. The lamp rests on a heavy nickeled cast

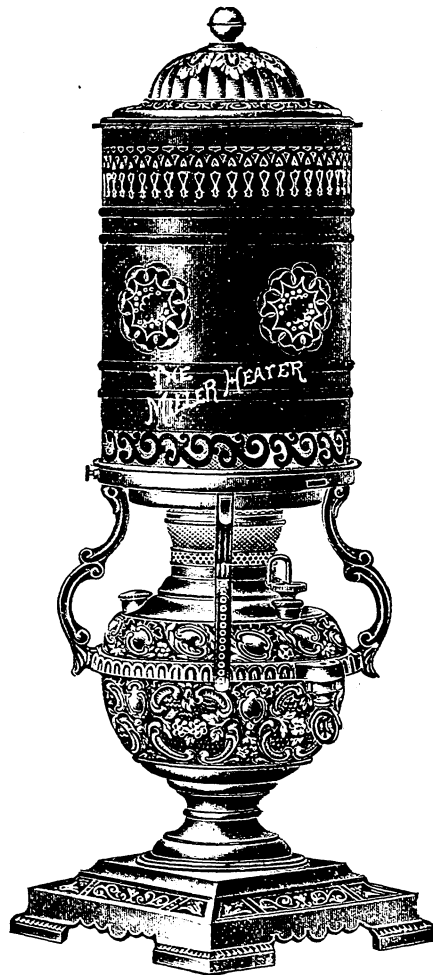


Fig. 1.—Miller Oil Heater.

base, and is provided with a brass nickeled top. Top or bottom wick adjuster is provided, as desired. The heater cylinder is of Russia iron, with mica at the bottom, all resting on the body of the lamp. The point is emphasized that the cylinder is supported on and locked to the main body of the lamp instead of on the chimney gallery. After the cylinder rest is in place it is

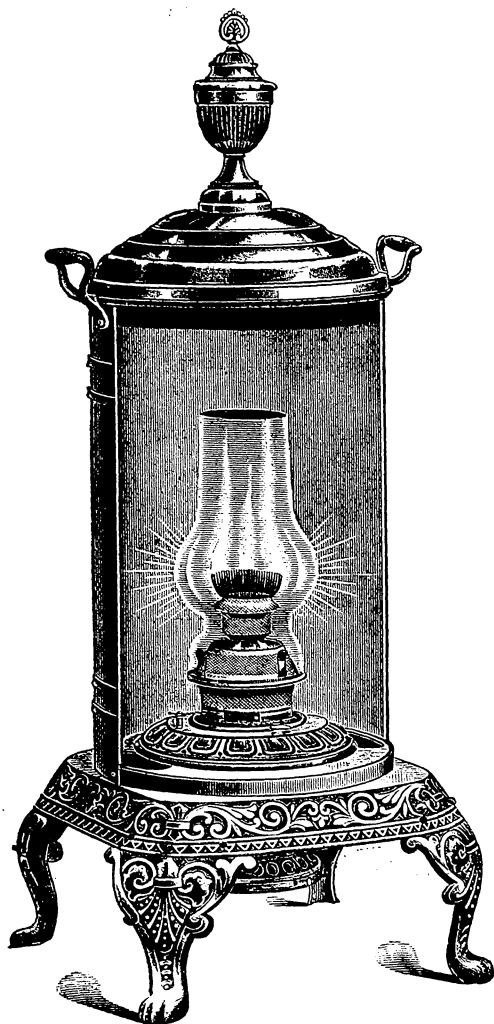


Fig. 2.—Mode of Lighting the Heater.

fastened on the lamp by an eccentric looking device. The heaters are made in five sizes and styles, designed to heat rooms from 8 to 14 feet square. By removing the cylinder and substituting a chimney, the lamp may be used for lighting purposes. Fig. 2 illustrates how the lamp is lighted with or without the chimney.

Browne's Lamp Heating Stove.

The Breitting Metal Ware Mfg. Company, Huron and Sedgwick streets, Chicago, are manufacturing a recently patented oil lamp heater which is herewith illustrated. It is intended to be used for cooking and heating, as well as for light. The height of this heater is 40 inches over all, while the diameter is 12 inches. The lamp is partly encircled by a highly polished tin reflector which fits into an opening in the base. Cold air is admitted from the floor, heated, and discharged at the top, causing a circulation of heated air in the room. The B. & H. lamp is used, which not



Browne's Lamp Heating Stove.

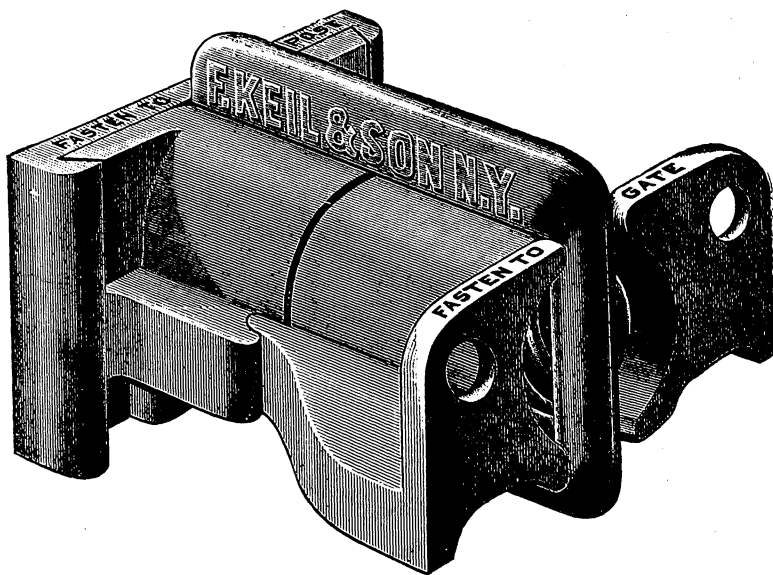
only perfectly consumes oil without odor or smoke, but also provides a very brilliant light. The urn and top are nickeled, and in every respect the heater is handsomely finished.

The Superior Hinge.

Francis Keil & Son, 163d street, west of Third avenue, New York, are introducing the Superior hinge, as shown herewith. The hinges are made of malleable iron to prevent breaking, and every hinge is warranted by the makers. The hinge is described as swinging both ways, as not raising the gate as ordinary hinges do, but as opening level. The manufacturers claim that the hinge is self shutting, always stopping at the center; that it has no parts to get loose or out of place; that it is easily applied and cannot get out of order. The point is made that any

catch can be used with the hinges, but that none is necessary. The hinge is designed for use on house gates, and has, we are advised, been adopted for

the result of a great deal of experimenting on their part to produce a hook which would be lighter than those now on the market, and at the same time



The Superior Hinge.

office gates. The goods are furnished in japan, copper plated, polished bronze metal, nickel plated.

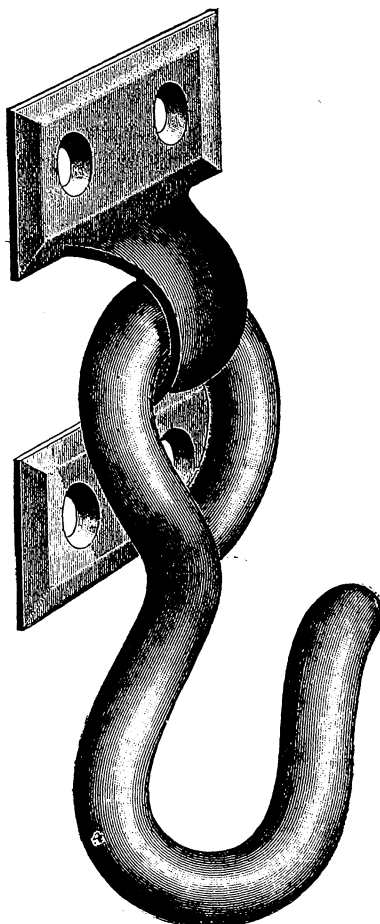
Stearns' No. 200 Hammock Hook.

E. C. Stearns & Co., Syracuse, N. Y., are putting the hammock hook here-

possess equal strength; that although the hook is very light it is at the same time capable of sustaining great weight, and that they have no hesitation in pronouncing it as strong as any of the regular size hammock hooks on the market. The hooks are tin finish, and are packed 1 dozen in a box.

The Ideal Implements.

Ideal Mfg. Company, New Haven, Conn., have issued a circular addressed particularly to their foreign trade, which states that those who have used the Ideal implements for American arms and shells have frequently requested the company to make implements for the various other kinds of arms and shells they have in use, also to prepare a list that would inform the users as to which were alike in the English and American manufacture, and to specify the tool that is adapted to them. In compliance with this request the company have prepared a list for the convenience of the foreign trade using Ideal implements, showing which cartridges are alike of English and American manufacture and the tool that is adapted to them. In this list the name of the cartridge as given in Eley Brothers' catalogue is first presented, and on the same line, under the head of American, is given the name of the same cartridge made by the Union Metallic and Winchester Cartridge companies, U. S. A.; followed by the name of the particular Ideal tool required to load them. This list is designed to be used in connection with the Ideal catalogue, which illustrates the implements and gives list prices. The circular further states that at the request of P. Webley & Sons of Birmingham, England, the Ideal Company have recently perfected a model tool for the Webley's 0.450 and 0.455 revolvers, as supplied to the English department of war. The shells as made by Eley Brothers of London, or by the Union Metallic Cartridge Company of Bridgeport, Conn., U. S. A., we are advised, may be used. The company have also made tools for casting bullets and reloading the Lee-Metford (Eley's 0.303) and are now prepared to furnish the same on order.



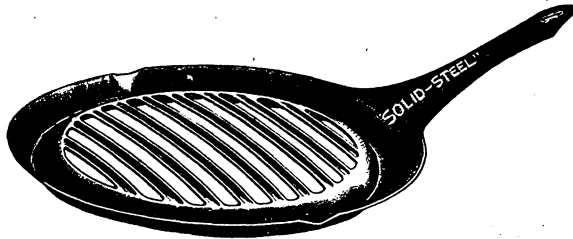
Stearns' No. 200 Hammock Hook.

with illustrated, on the market. The plate is made of a special quality annealed sheet steel, and the hook is formed up from $\frac{3}{8}$ -inch wrought iron. The company state that the article is

Steel Broiler.

The accompanying cut represents a steel broiler being introduced by the Cleveland Stamping & Tool Company, Cleveland, Ohio. The broiler is made of a single piece of heavy, cold

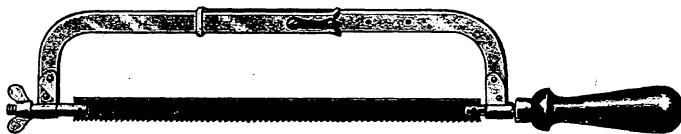
like a footless sock without the leg, and should not be had at any price. It is very desirable that the wheels should be fitted with spokes, as otherwise the rims are easily bent. With these tips in view, any one should be able to choose a mount for himself without the ex-

*Steel Broiler.*

rolled steel, all in one piece, which the manufacturers claim is peculiar only to this broiler. The point is made that it has no seams or rivets to catch grease, that it will not warp, that it cannot be broken and that it catches all of the juice of the meat.

The California Extension Hack Saw Frame.

The extension hack saw frame herewith shown is put on the market by Knapp & Cowles Mfg. Company, Bridge port, Conn. The frame is made of steel,

*The California Extension Hack Saw Frame.*

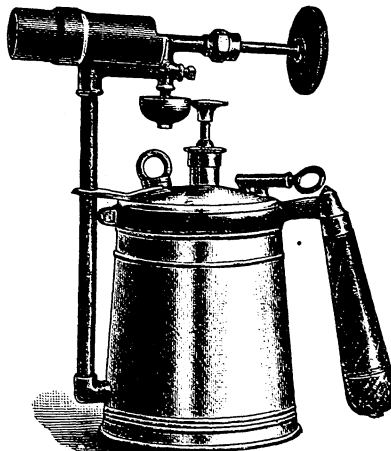
and is so constructed that it can be easily extended from 8 to 12 inches. This is accomplished by the parts slipping past each other, and being held at the desired point by a rivet attached to a spring, dropping into a hole. The frame is as firm as a solid one when the saw is inserted in position. A thumb screw allows the saw to be tightened after it is in place, and the handle and the piece to which the thumb piece is attached are arranged so that the saw may be set at different angles to the frame as desired. The handle is of enameled wood, and the metal part of the frame is nicely furnished and polished. The frame is also made with solid back for 8-inch saws

How to Buy a Bicycle.

A Scottish newspaper publishes the following unique hints on "how to buy a bicycle:"

Always see that the bicycle offered you for sale has got two wheels, and that they are attached by some solid substance. Otherwise, the one may go and leave the other behind. The next point to observe is that the cycle is supplied with a saddle, as it will be found to be very irksome to ride long distances perched on the point of a saddle pillar. It should be possessed of two pedals fixed on as many cranks. If the pedals describe a circle without fetching the cranks along with them that is a clear and sure sign of early bronchial affection of the tubes, and that the machine should be unhesitatingly discarded. Looking around for a moment to suit your taste, bear in mind that a wheel without rims is

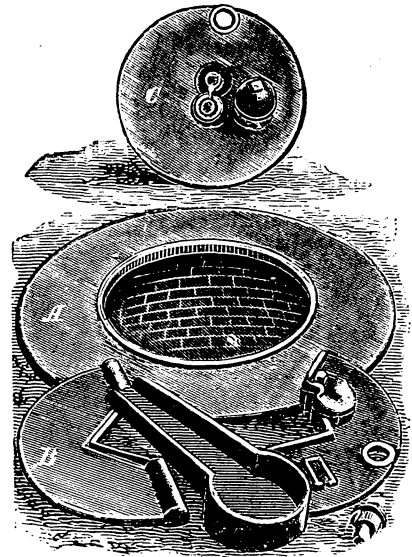
encircles the tank, to enable the operator to throw the flame in any direction without exertion. The tank, pump, &c., are of brass, and the flame is referred to as being blue and very powerful, from 6 to 8 inches long. It is explained that for corners or places in wood work out of ordinary reach the burner will be found serviceable, as the flame can be thrown in any direction desired. The point is

*The Quick Meal Adjustable Paint Burner.*

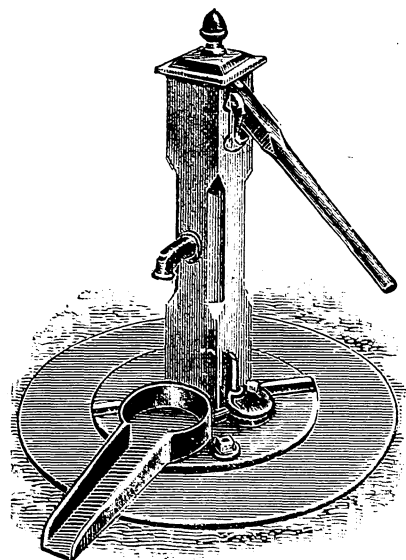
made that when the burner needs repairing it is not necessary to make a brazed or soldered joint, and that it is easily taken apart for cleaning and repairing. The burner is designed for the use of plumbers, painters, wood workers, &c.

The Safety Cistern and Well Cover.

The Safety cistern and well cover shown in the accompanying cuts is offered by Menefee & De Vilbiss, Fort Wayne, Ind. The cover is made of cast iron, joggled to prevent rusting, having an outer rim (Fig. 1, Letter A), which is to be firmly cemented to the

*Fig. 1.—The Safety Cistern and Well Cover.*

wall of the cistern or well, to obviate any possibility of bugs or worms getting into it. It is provided with an adjustable lid (Fig. 1, Letter B), to be used in connection with a pump, to fasten it in position, as in Fig. 2. For a pump placed in the house a solid lid is provided (Fig. 1, Letter C), instead of the split lid, this being fastened by

*Fig. 2.—The Cover in Connection with Pump.*

a lock bolt, to obviate danger to children. The cover is provided with an air box, to allow foul air to escape, to keep the water in a pure and healthy condition. It is explained that the construction is such that no surface or waste water can possibly return into the cistern or well, and that either lid can be removed without disturbing the outer rim by the use of a common wrench. The manufacturers remark

that the device, besides being as cheap as others, is free from dirt and insects, and that it is not open to the objections of wood covers, the underside of which become damp, causing decay, a growth of vegetation, and become inhabited with vermin, small snakes, &c. ; also that, unlike wood covers, it will not become rotten and unsafe.

The Automatic Refrigerator.

The Illinois Refrigerator Company, 909 Masonic Temple, Chicago, are manufacturing a new line of refrigerat-

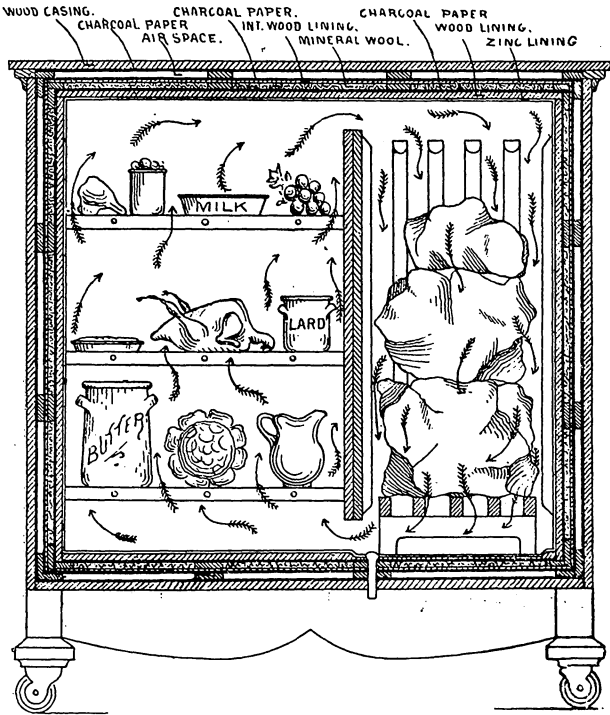
been made agents for New England, New York, New Jersey, Pennsylvania and Pacific Coast, as well as all export trade.

A New Padlock.

The accompanying cut represents a padlock being introduced by the Keystone Lock Works, Lancaster, Pa., for whom Surpluss, Dunn & Alder, 79 Chambers street, New York, are agents. The lock, which the cut shows full size, is heavy, with oval case both front and back, having all inside work of

shackle, on steel; plain solid real bronze metal and antique copper finish on solid real bronze.

Razorine Mfg. Company, 2 West Fourteenth street, New York, are putting on the market a preparation for sharpening razors called Razorine. It is a small, hard cake 1 1/4 x 1 x 1/4 inch in size, of a reddish color. It may be rubbed on any strop, whether of leather, canvas or stone side. The finish is made by stropping on leather without the Razorine. The preparation is said not to harm the finest razor.

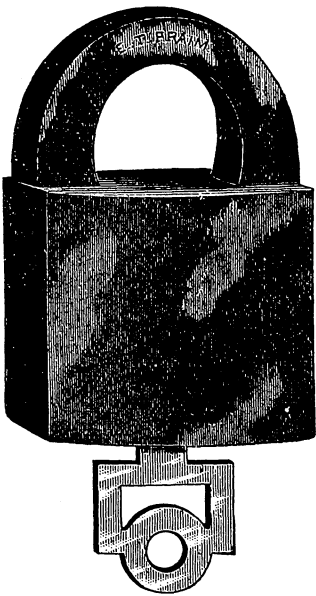


Interior of Automatic Refrigerator.

ors. The illustration given herewith shows the distinctive features of the construction which has been adopted. It will be seen that the ice chamber is placed at the side of the provision chamber. The illustration also shows the manner in which the circulation of air is secured. The air in the ice chamber being colder and heavier than elsewhere, falls to the bottom and flows out under the partition into the provision chamber. The warmer air in the provision chamber flows over the partition into the ice chamber to take the place of the cold air passing out below. As it is cooled it falls. Thus a circulation is secured. The manufacturers state that as the vapors and odor from the food come in contact with the ice they are condensed and drawn off with the waste water from the ice. All the food being above the drip basin, it will be seen that no damage can result should the waste pipe become clogged.

East Mfg. Company, Buffalo, N. Y., are offering two household preparations recently brought out. One is the Instant Crockery Mender, for cementing leather, wood, glassware, iron, &c. It is in liquid form, requires no heating and sets quickly. The other, Glistening Cream, is for polishing wood, furniture, pianos, &c. Both are put up in illuminated cardboard display boxes with hinged cover and contain 12 bottles each. Geo. F. Eberhard Company, 64 William street, New York, have

brass. It is self locking, with spring shackle, and each lock is supplied with two flat steel keys. The locks are fur-



A New Padlock.

nished in solid steel, Bower-Barff finish on case, polished shackle; solid steel case, Bower-Barff finished, bronze metal shackle; antique copper finish, case and

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Current Hardware Prices.

DECEMBER 6, 1893.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

The character @ is used to indicate a range of price; thus discount 50&10@50&10&5 % signifies that the goods in question are sold at prices ranging from discount 50 and 10 % to discount 50 and 10 and 5 %.

Adjusters, Blind—

Domestic \$ doz \$3.00, 33%&38%&10%
Excelsior \$ doz \$10.00, 50&10&25
North's list net @ 10%
Zimmerman's—See Fasteners Blind.

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—

Am. Wrought, Horse shoe brand, 11@11%
Armstrong's Mouse Hole..... 10%&11%
Eagle Anvil, 8" x 4"..... 10%&11%
Moore & Barnes Mfg. Co..... 93%
S. & H. machine finished..... 10%&11%
Trenton..... 10%&11%
Wilkinson's..... 10%&11%
Peter Wright's..... 11%&11%

Anvil Vise and Drill—

Allen Anvil and Vise \$3.00..... 40&10%
Cheney Anvil and Vise..... 25%
Millers Falls Co., \$18.00..... 20%
Star..... 45&55

Apple Parers—See Parers Apple, &c.

Augers and Bits—

Boring Machine Augers..... 70@70&10%
Car Bits, 12-in. twist..... 50%
Common Augers and Bits..... 70@70&10%
Cincinnati Bell-Hangers' Bits..... 30&10%
Forster Pat. Auger Bits..... 93%
Jennings' Pattern Car Bits..... 40%
Jennings' Pattern Auger Bits..... 60%
C. E. Jennings & Co., No. 10, extension lip..... 40%
C. E. Jennings & Co., No. 30..... 60%
C. E. Jennings & Co., Auger Bits, 3" set 32%
Russell Jennings' Augers and Bits, 25&10%
Lewis' Patent Single twist..... 45%
L'Hommedieu Car Bits..... 15&10%
Pugh's Black..... 20%
Pugh's Jennings Pattern..... 30%
Snell's Bits..... 60&55

Bit Stock Drills—

Cleveland..... 50&10&55
Cincinnati, for wood..... 30&10%
Cincinnati, for metal..... 45&10%
Morse twist Drills..... 50&10&55
Standard..... 50&10&55
Syracuse, for metal..... 50&10%
Syracuse, for wood (wood list), 30&80&55

Expansive Bits—

Clark's small, \$18; large, \$26..... 35&35&10%
Ives' No. 4, \$ doz \$80..... 40%
Steer's No. 1, \$28; No. 2, \$18..... 35&40%
Stearns' No. 2, \$48..... 20%
Swan's..... 40&45

Gimlet Bits—

Bee..... 25&25&55
Common..... \$ gross \$2.70@3.20
Diamond..... \$ doz \$1.25..... 40&10%
Double Cut..... 45&45&10%
Shepardson's..... 45&45&10%
Ct. Valley Mfg. Co..... 30&10%
Hartwell's..... \$ gr. \$10.00..... 30&10%
Douglass..... 40&10%
Ives..... 60&60&10%

Hollow Augers—

Bonney's Adjustable, \$ doz \$48..... 50%
Cincinnati Adjustable..... 25&10%
Cincinnati Standard..... 25&10%
Douglass..... 33%&33%&10%
French, Swift & Co. (Beecher)..... 33%&33%&10%
Ives'..... 33%&33%&10%
Ives' Expansive, each \$4.50..... 50&55
Stearns..... 20&10%
Universal Expansive, each \$4.50..... 20%
Wood's..... 25&25&10%

Ship Augers and Bits—

L'Hommedieu's..... 15&10&15&10&55
Snell's..... 25&25&10%
Snell's Ship Auger Pattern Car Bits..... 15&10&15&10&55
Watrous'..... 25&25&10%

Awl Hfts—See Hfts, Awl.

Awls—

Awls, Sewing, Common..... \$ gr. 85¢@90¢
Awls, Should. Peg..... \$ gr. \$1.50@1.55
Awls, Pat. Peg..... \$ gr. 35¢@38¢
Awls, Shouldered Brad..... \$ gr. \$1.30@1.40
Awls, Handled Brad..... \$ gr. \$2.50@3.00
Awls, Handled Scratch..... \$ gr. \$4.00@4.50
Awls, Socket Scratch..... \$ doz. \$1.10@1.20

Awl and Tool Sets—See Sets, Awl and Tool.

Axes—

Plain. Beveled.
First quality, best brands, \$7.00 \$7.50
First qual., other brands } 6.50 7.00
Second quality..... 5.50 6.00

Axle Grease—See Grease, Axle.

Axles—

No. 1..... 3%&4¢@4¢ 4%&5¢
Nos. 7 to 14..... 70%
Nos. 15 to 28..... 47%
Nos. 19 to 22..... 70%
Concord Axles, loose collar..... 3% cash
Concord Axles, solid collar..... 4%&5¢
5¢@6¢

Bag Holders—See Holders, Bag.

Balances—

Spring Balances..... 40%
No. 20..... 20 30 50
Chatillon, \$ doz..... \$0.80 0.95 1.75 net
Chatillon Straight Balances..... 40%
Chatillon Circular Balances..... 50&10%

Barb Wire—See Wire, Barb.

Bars—

Crow—

Cast Steel..... \$ doz \$3%
Iron, Steel Points..... \$ doz \$3%

Basins, Wash—

Standard Fiberglass, No. 1, 10% in. \$1.80;
12-inch, \$2.00; 13% inch, \$2.50; 15-inch, \$3.00.

Beams, Scale—

Scale Beams, List Jan. 12, '82. 50&10%
Chatillon's No. 1..... 40%
Chatillon's No. 2..... 40%
Custer's..... 35&45

Beaters—

Egg—

Bryant's..... \$ gross \$14.00
Double (H. & R. Mfg. Co.), \$ gro. No. 0 \$12.00; No. 1, \$15.00; No. 2..... 38.00
Dover..... \$ doz \$1.00@1.20
Dover (Standard Co.)..... \$ doz \$1.00
Duplex (Standard Co.)..... \$ doz \$1.00
Duplex Extra Heavy (Standard Co.)..... \$ doz \$3.50
Easy (H. & R. Mfg. Co.)..... \$ gro \$12.00
Improved Acme (H. & R. Mfg. Co.)..... \$ gro \$9.00
Silver & Co..... \$ doz \$5.50
Spiral..... \$ gro \$4.25 @ \$4.50
Triple (H. & R. Mfg. Co.)..... \$ doz \$15.50

Culinary—

Keystone, P. D. & Co., Each, No. 1, \$1;
No. 2, \$2..... 20%

Bells—

Cow—

Common Wrought..... 60&10%
Dodge, Genuine Kentucky..... 70@70&10%
Kentucky Durham..... 70&10%
Kentucky, Sargent's list..... 70&10%
Kentucky "Star"..... 20&10%
Texas Star..... 50&10%
Western, Sargent's list..... 70&10%

Door—

Crank, Brooks'..... 50&10&25%
Crank, Cone's..... 10%
Crank, Cone's..... 20&10%
Gong, Abbe's..... 35&45
Gong, Barton's..... 40&10%
Gong, Yankee..... 45&10%
Lever, R. & E. Mfg. Co.'s..... 50&10&25%
Lever, Sargent's..... 60&10%
Lever, Taylor's Bronzed or Plated..... net
Lever, Taylor's Japanned..... 25&10%
Pull, Brooks'..... 50&10&25%

Electric—

Rigelow & Dowse..... 20%
Wollensak's..... 20%

Hand—

Extra Heavy Brass..... 70%
Light Brass..... 70&10%
Silver Chime..... 35%
White, Sargent's..... 70%
Globe Cone's Patent..... 25&10%
Miscellaneous..... 45&50%

Miscellaneous—

Call..... 45&50%
Farm Bells..... \$ doz \$3%
Steel Alloy Church and School Bells..... 45%
Blacksmiths'..... 60&10&55
Hand Bells..... 40&10%
Molders'..... 40&10%
Belting, Rubber—

Common Standard..... 75@75&10%
Extra..... 60&10%
Standard..... 70&55
N.Y.B. & P. Co., Carbon..... 60&60&55
N.Y.B. & P. Co., Diamond..... 50&50&55
N.Y.B. & P. Co., Para..... 40&40&55

Bench Stops—See Stops, Bench

Benders and Upsetters,

Tire—

Detroit Perfect Tire Bender..... 15%
Green River Tire Benders and Upsetters..... 20%
Stoddard's Lightning Tire Upsetters..... 15%

Bits—

Auger, Gimlet, Bit Stock Drills, &c., see Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—

Cleveland Block Co., Mal. Iron, 60&60&10%
Moore's Novelty, Mal. Iron..... 50%
Sure Grip Steel Tackle Block..... 25%
See also Machines, Hoisting

Boils—

Carriage, Machine, &c.—

Com. list June 10, '84..... 80&55
Genuine Eagle, Norway, list Oct. '84..... 80&55
Eagle, Norway, list Oct. '84..... 80&55
Phila. pattern, list Oct. 7, '84..... 80%
R.B.W., old list..... 70%
Bolt Ends, list Jan. 1, 1890..... 80&10%
Machine, list Jan. 1, 1890..... 80&10%
Door and Shutter—

Cast Iron Barrel, Square, &c..... 70&10%
Cast Iron Chain (Sargent's list)..... 65&10%
Cast Iron Shutter Bolts..... 70&10%
Ives' Patent Door Bolts..... 60&10%
Wrought Barrel..... 70&10%
W.R. K. Flush, Common..... 55&10%
W.R. Shutter, Sargent's list..... 60&10%
W.R. Shutter, all iron, Stanley's..... 60&10%
Wrought Square..... 70&10%
W.R. Sunk Flush, Sargent's list..... 60&10%
W.R. Sunk Flush, Stanley's list..... 50&10%
Stove and Plow—

Plow..... 60&10%
Stove..... 60&10%
R. B. & W., Plow..... 55%

Tire—

Common, list Feb. 28, '83..... 65@65&55
American Screw Company..... 75%
Eagle, Phila., list Oct. 16, '84..... 30%
Philadelph., list Oct. 16, '84..... 30%
Bay State, list Feb. 28, '83..... 65%
Empire list Feb. 28, '83..... 65%
Keystone, Philadelph., list Oct. '84..... 30%
Norway, Phila., list Oct. '84..... 75%
R. B. & W., Philadelph., list Oct. 16, '84..... 30%

Borers, Tap—

Common and Ring..... 20&10%
Clark's..... 33%
Enterprise Mfg. Co..... 20%
Ives' Tap Borers..... 33%
Borax—

Boring Machines—See Machines, Boring.

Bow Pins—See Pins, Bow.

Boxes, Wagon—

Per doz..... 2%
Boxes, Miter.

Spiker's Excelsior, 3 in. \$7.50, 4 in \$8.50, 5 in \$13.00, 6 in \$15.00..... 20%

Braces—

American Bit Brace and Tool Co..... 60&10%
Nos. 10, 12, 20..... 60&10%
Nos. 11, 21, 24, 27..... 70&10%
Nos. 22, 23, 25..... 60&10%
Nos. 13, 26, 36, 37..... 70&10%
Amidon's..... 75&10%
Barker's Imp'd Plain..... 75&10%
Barker's Imp'd Nickle..... 65&10%
Ratchet..... 75&10%
Eclipse Ratchet..... 60%
Globe Jawed..... 40&40&10%
Hartwell's..... 40&40&10%
Universal, 8 in. \$2.10; 10 in. \$2.25; 12 in. \$2.50; 14 in. \$3.00; 16 in. \$3.50; 18 in. \$4.00; 20 in. \$4.50; 22 in. \$5.00; 24 in. \$5.50; 26 in. \$6.00; 28 in. \$6.50; 30 in. \$7.00; 32 in. \$7.50; 34 in. \$8.00; 36 in. \$8.50; 38 in. \$9.00; 40 in. \$9.50; 42 in. \$10.00; 44 in. \$10.50; 46 in. \$11.00; 48 in. \$11.50; 50 in. \$12.00; 52 in. \$12.50; 54 in. \$13.00; 56 in. \$13.50; 58 in. \$14.00; 60 in. \$14.50; 62 in. \$15.00; 64 in. \$15.50; 66 in. \$16.00; 68 in. \$16.50; 70 in. \$17.00; 72 in. \$17.50; 74 in. \$18.00; 76 in. \$18.50; 78 in. \$19.00; 80 in. \$19.50; 82 in. \$20.00; 84 in. \$20.50; 86 in. \$21.00; 88 in. \$21.50; 90 in. \$22.00; 92 in. \$22.50; 94 in. \$23.00; 96 in. \$23.50; 98 in. \$24.00; 100 in. \$24.50; 102 in. \$25.00; 104 in. \$25.50; 106 in. \$26.00; 108 in. \$26.50; 110 in. \$27.00; 112 in. \$27.50; 114 in. \$28.00; 116 in. \$28.50; 118 in. \$29.00; 120 in. \$29.50; 122 in. \$30.00; 124 in. \$30.50; 126 in. \$31.00; 128 in. \$31.50; 130 in. \$32.00; 132 in. \$32.50; 134 in. \$33.00; 136 in. \$33.50; 138 in. \$34.00; 140 in. \$34.50; 142 in. \$35.00; 144 in. \$35.50; 146 in. \$36.00; 148 in. \$36.50; 150 in. \$37.00; 152 in. \$37.50; 154 in. \$38.00; 156 in. \$38.50; 158 in. \$39.00; 160 in. \$39.50; 162 in. \$40.00; 164 in. \$40.50; 166 in. \$41.00; 168 in. \$41.50; 170 in. \$42.00; 172 in. \$42.50; 174 in. \$43.00; 176 in. \$43.50; 178 in. \$44.00; 180 in. \$44.50; 182 in. \$45.00; 184 in. \$45.50; 186 in. \$46.00; 188 in. \$46.50; 190 in. \$47.00; 192 in. \$47.50; 194 in. \$48.00; 196 in. \$48.50; 198 in. \$49.00; 200 in. \$49.50; 202 in. \$50.00; 204 in. \$50.50; 206 in. \$51.00; 208 in. \$51.50; 210 in. \$52.00; 212 in. \$52.50; 214 in. \$53.00; 216 in. \$53.50; 218 in. \$54.00; 220 in. \$54.50; 222 in. \$55.00; 224 in. \$55.50; 226 in. \$56.00; 228 in. \$56.50; 230 in. \$57.00; 232 in. \$57.50; 234 in. \$58.00; 236 in. \$58.50; 238 in. \$59.00; 240 in. \$59.50; 242 in. \$60.00; 244 in. \$60.50; 246 in. \$61.00; 248 in. \$61.50; 250 in. \$62.00; 252 in. \$62.50; 254 in. \$63.00; 256 in. \$63.50; 258 in. \$64.00; 260 in. \$64.50; 262 in. \$65.00; 264 in. \$65.50; 266 in. \$66.00; 268 in. \$66.50; 270 in. \$67.00; 272 in. \$67.50; 274 in. \$68.00; 276 in. \$68.50; 278 in. \$69.00; 280 in. \$69.50; 282 in. \$70.00; 284 in. \$70.50; 286 in. \$71.00; 288 in. \$71.50; 290 in. \$72.00; 292 in. \$72.50; 294 in. \$73.00; 296 in. \$73.50; 298 in. \$74.00; 300 in. \$74.50; 302 in. \$75.00; 304 in. \$75.50; 306 in. \$76.00; 308 in. \$76.50; 310 in. \$77.00; 312 in. \$77.50; 314 in. \$78.00; 316 in. \$78.50; 318 in. \$79.00; 320 in. \$79.50; 322 in. \$80.00; 324 in. \$80.50; 326 in. \$81.00; 328 in. \$81.50; 330 in. \$82.00; 332 in. \$82.50; 334 in. \$83.00; 336 in. \$83.50; 338 in. \$84.00; 340 in. \$84.50; 342 in. \$85.00; 344 in. \$85.50; 346 in. \$86.00; 348 in. \$86.50; 350 in. \$87.00; 352 in. \$87.50; 354 in. \$88.00; 356 in. \$88.50; 358 in. \$89.00; 360 in. \$89.50; 362 in. \$90.00; 364 in. \$90.50; 366 in. \$91.00; 368 in. \$91.50; 370 in. \$92.00; 372 in. \$92.50; 374 in. \$93.00; 376 in. \$93.50; 378 in. \$94.00; 380 in. \$94.50; 382 in. \$95.00; 384 in. \$95.50; 386 in. \$96.00; 388 in. \$96.50; 390 in. \$97.00; 392 in. \$97.50; 394 in. \$98.00; 396 in. \$98.50; 398 in. \$99.00; 400 in. \$99.50; 402 in. \$100.00; 404 in. \$100.50; 406 in. \$101.00; 408 in. \$101.50; 410 in. \$102.00; 412 in. \$102.50; 414 in. \$103.00; 416 in. \$103.50; 418 in. \$104.00; 420 in. \$104.50; 422 in. \$105.00; 424 in. \$105.50; 426 in. \$106.00; 428 in. \$106.50; 430 in. \$107.00; 432 in. \$107.50; 434 in. \$108.00; 436 in. \$108.50; 438 in. \$109.00; 440 in. \$109.50; 442 in. \$110.00; 444 in. \$110.50; 446 in. \$111.00; 448 in. \$111.50; 450 in. \$112.00; 452 in. \$112.50; 454 in. \$113.00; 456 in. \$113.50; 458 in. \$114.00; 460 in. \$114.50; 462 in. \$115.00; 464 in. \$115.50; 466 in. \$116.00; 468 in. \$116.50; 470 in. \$117.00; 472 in. \$117.50; 474 in. \$118.00; 476 in. \$118.50; 478 in. \$119.00; 480 in. \$119.50; 482 in. \$120.00; 484 in. \$120.50; 486 in. \$121.00; 488 in. \$121.50; 490 in. \$122.00; 492 in. \$122.50; 494 in. \$123.00; 496 in. \$123.50; 498 in. \$124.00; 500 in. \$124.50; 502 in. \$125.00; 504 in. \$125.50; 506 in. \$126.00; 508 in. \$126.50; 510 in. \$127.00; 512 in. \$127.50; 514 in. \$128.00; 516 in. \$128.50; 518 in. \$129.00; 520 in. \$129.50; 522 in. \$130.00; 524 in. \$130.50; 526 in. \$131.00; 528 in. \$131.50; 530 in. \$132.00; 532 in. \$132.50; 534 in. \$133.00; 536 in. \$133.50; 538 in. \$134.00; 540 in. \$134.50; 542 in. \$135.00; 544 in. \$135.50; 546 in. \$136.00; 548 in. \$136.50; 550 in. \$137.00; 552 in. \$137.50; 554 in. \$138.00; 556 in. \$138.50; 558 in. \$139.00; 560 in. \$139.50; 562 in. \$140.00; 564 in. \$140.50; 566 in. \$141.00; 568 in. \$141.50; 570 in. \$142.00; 572 in. \$142.50; 574 in. \$143.00; 576 in. \$143.50; 578 in. \$144.00; 580 in. \$144.50; 582 in. \$145.00; 584 in. \$145.50; 586 in. \$146.00; 588 in. \$146.50; 590 in. \$147.00; 592 in. \$147.50; 594 in. \$148.00; 596 in. \$148.50; 598 in. \$149.00; 600 in. \$149.50; 602 in. \$150.00; 604 in. \$150.50; 606 in. \$151.00; 608 in. \$151.50; 610 in. \$152.00; 612 in. \$152.50; 614 in. \$153.00; 616 in. \$153.50; 618 in. \$154.00; 620 in. \$154.50; 622 in. \$155.00; 624 in. \$155.50; 626 in. \$156.00; 628 in. \$156.50; 630 in. \$157.00; 632 in. \$157.50; 634 in. \$158.00; 636 in. \$158.50; 638 in. \$159.00; 640 in. \$159.50; 642 in. \$160.00; 644 in. \$160.50; 646 in. \$161.00; 648 in. \$161.50; 650 in. \$162.00; 652 in. \$162.50; 654 in. \$163.00; 656 in. \$163.50; 658 in. \$164.00; 660 in. \$164.50; 662 in. \$165.00; 664 in. \$165.50; 666 in. \$166.00; 668 in. \$166.50; 670 in. \$167.00; 672 in. \$167.50; 674 in. \$168.00; 676 in. \$168.50; 678 in. \$169.00; 680 in. \$169.50; 682 in. \$170.00; 684 in. \$170.50; 686 in. \$171.00; 688 in. \$171.50; 690 in. \$172.00; 692 in. \$172.50; 694 in. \$173.00; 696 in. \$173.50; 698 in. \$174.00;

Chalk Lines—See Lines.**Checks, Door—****Chisels—****Socket Framing and Firmer****Mix****New Haven****Ohio Tool Co.****P. S. & W. Co.****Wetherby****Buck Bros.****Douglas****Merrill****L. & I. White****Tanged and Miscellaneous****Buck Bros.****Butchers'****Cold Chisels, fair quality, 7 D****Spear & Jacksons****Tanged Firmers****Chucks—****Beach Pat.****Danbury****Graham Patent****Syracuse Adjustable, each, 7.00, 20.00, 25.00****Syracuse, Balz Pat.****Skinner's Patent Chucks****Combination Lathe Chucks****Drill Chucks****Independent Lathe Chucks****Universal Lathe Chucks****Union Mfg. Co.****Combination****Independent****Universal****Victor****Churns—****McDermid Star Barrel Churn, each****6 gal., \$2.60; 10 gal., \$2.75; 15 gal.,****\$3.00; 20 gal., \$3.25.****Tiffin Union, each, 5 gal. \$3.25; 7 gal.,****\$3.75; 10 gal., \$4.25.****Clamps—****Adjustable, Cincinnati****Adjustable, Hammers****Adjustable, Hammers****Barnes' Machine's Clamps****Cabinet, Sargent's****Carpenter's, Cincinnati****Carriage Makers', P. S. & W. Co.****Carriage Makers', Sargent's****Eberhard Mfg. Co.****R. L. Tool Co.'s Wrought Iron****Saw Clamps, see Vices, Saw Filers****Stearns' Adjustable Cabinet and Cor-****ner****Warner's****Cleavers, Butchers'—****Beatty's****Bradley's****Foster Bros.****New Haven Edge Tool Co.'s****P. S. & W.****Schulte, Lohr & Co.****L. & I. J. White****Clips—****Baker Axle Clips****Norway, Axle, 1/4 & 5-16****Norway Spring Bar Clips, 5-16****2d grade Norway Axle, 1/4 & 5-16****Steel Felloe Clips****Superior Axle Clips****Wrought Iron Felloe Clips****Cloth and Netting, Wire****Cocks—****Hardware List (Globe, Kerosene, Lever****Bibbs, Racking, &c.)****Coffee Mills—See Mills, Coffee.****Collars, Dog—****Brass, Pope & Stevens' list****Chapman Mfg. Company, new list****Embossed, Gilt, Pope & Stevens' list****Leather, Pope & Stevens' list****Medford Fancy Goods Co.****Combs, Curry—****American Curry Comb Co.****Fitch's****Kohler's Humane****Kohler's Magic Oscillating****Rubber, per doz., 10.00****Compasses, Dividers & C.****Compasses, Callipers, Dividers, 70 & 10****Bennet & Call Co.'s****Dividers****Callipers, Call's Patent Inside****Callipers, Double****Callipers, Inside or Outside****Callipers, Wing****Compasses****Excelsior****Starrett's****Combination Dividers****Lock Callipers and Dividers****Spring Callipers and Dividers****Stevens & Co.'s****Coolers, Water—****S. S. & Co., 2-gal., \$2.00; 3-gal., \$2.50;****4-gal., \$2.75; 6-gal., \$3.40 each.****Coppers, Cools—****See Tools, Coppers.****Cord—****Braided, Crown, Drab and Fancy, 1/8****65c.****Braided, Crown, White, 1/8 50c.****Cable Laid Italian Sash, 1/8 10c.****Common****Common Russia Sash, 1/8 12c.****Egyptian, Ind. Hemp, Braided****India Cable Laid Sash, 1/8 11c.****Massachusetts, White****Ossawa Mills—****Braided, Giant, Drab and Fancy, 1/8****35c.****Braided, Giant, White, 1/8 30c.****Patent, good quality****Patent Russia Sash, 1/8 10c.****Barnum****Braided, Drab Cotton****Braided, Italian Hemp****Braided, Linen****Braided, White Cotton****Semper Item, Braided, White****Silver Lake****A quality, Drab, 55c.****A quality, White, 50c.****B quality, Drab, 35c.****B quality, White, 30c.****Sylvan Spring, Extra Braided, Drab****Sylvan Spring, Extra Braided, White****Tate's Solid Braided****Economy Drab****Economy White****Hercules, Drab****Hercules, White****White Cotton Braided, fair****Wire Picture—****Braided or Twisted****Corkscrews—See Screws, Cork.****Corn Knives and Cutters****Crackers, Nut—****Acme****Japanned, 1/8 gro., \$30****Nickel Plated, 1/8 gro., \$30****Blake's Pattern, 1/8 doz., \$2.00****Table (H. & B. Mfg. Co.)****Turner & Seymour Mfg. Co.****Cradles—****Grain****Crayons—****White Crayons, 1/8 gross****D. M. Stewart Mfg. Co.****Metal Workers', 1/8 gross****Rolling Mill, 1/8 gross****Soapstone Pencils, 1/8 gross****See also Chalk.****Creamery Pails—See Pails,****Creamery.****Crow Bars—See Bars, Crow.****Curry Combs—****See Combs, Curry.****Curtain Pins—****See Pins, Curtain.****Cutters—****Meat—****American****Each****Enterprise****Nos.****Each****Dixon's****Nos.****Draw Cut****Nos.****Hale's****Nos.****Home No. 1****Nos.****Miles' Challenge****Nos.****Triumph No. 505****W. H. H. Co.****Nos.****Beef Shavers (Enterprise)****Chadborn's Smoked Beef Cutter****Slaw and Kraut—****Tucker & Dorsey Mfg. Co.****Slaw Cutters, 1 Knife****Slaw Cutters, 2 Knife****Tobacco****Acme****All Iron****Champion****Nashua Lock Co.'s****Sargent's****Wilson's****Washer—****Appleton's****Cincinnati****Johnson's****Penny's****Smith's Pat.****Diggers, Post Hole, &c.—****Cronk's Post Bars****Eureka Diggers****Fletcher Post Hole Augers****Gem, Improved****Gibbs' Columbia****Gibbs' Imperial****Gibbs' National****Gibbs' Post Hole Digger****Kohler's Hercules****Kohler's Invincible****Kohler's Little Giant****Kohler's New Champion****Samson****Schneider****Shimer's Hollow Handle****Vaughan's Post Hole Auger****Dividers—See Compases.****Dog Collars—See Collars, Dog.****Door Checks—****See Checks, Door.****Door Springs—****See Springs, Door.****Drawers.****Money****Wadell's Improved****Drawing Knives—****See Knives, Drawing.****Drills and Drill Stocks—****Blacksmiths'****Blacksmiths' Self-Feeding****Automatic Boring Tools****Breast, Bartholomew's****Breast, Millers Falls****Breast, P. S. & W.****Breast, Wilson's****Chicopee Automatic Drill****Goodell Automatic Drills****Ratchet, Curtis & Curtis****Ratchet, Ingersoll's****Ratchet, Merrill's****Ratchet, Moore's Triple Action****Ratchet, Parker's****Ratchet, Weston's****Ratchet, Whitney's****Whitneys Hand Drill, Plain****Adjustable****Twist Drills—****Cleveland****Diamond, V. & B.****Graham's Pat. Groove Shank****Morse****New Process****Standard****Syracuse (Metal List)****Drill Bits or Bit Stock****Drills—See Augers and Bits.****Drill Chucks—See Chucks.****Dripping Pans—****See Pans, Dripping.****Drivers, Screw—****Allard's Spiral, new list****Brace Screw Drivers****Buck Bros.****Buck Bros. Screw Driver Bits****Clark's Pat.****Cincinnati****Champion****Douglas Mfg. Co.****Ellrich's Socket and Ratchet****Fray's Hol. H. dle Sets****Gay & Parsons****Goodell's Automatic****Knapp & Cowles****Nos.****Nos.****Nos.****Nos. 4 and 00, Acme and Ideal****Kolb's Common Sense****Mayhew's Black Handle****Mayhew's Monarch****P. S. & W.****Sargent & Co.'s****No. 1, Forged Blade****Nos. 20, 40 and 60**

Halters—
 Covert's Adj. Rope Halters.....40&25
 Covert's Adj. Web Halters.....35&52
 Covert's Hemp Horse and Cattle Tie, 50&10&25
 Covert's Jute Cattle Ties.....70&10&25
 Covert's Jute Horse Ties.....70&25
 Covert's Rope, 7-18 in. Jute.....60&25
 Covert's Rope, 7-18 in. Hemp.....60&25
 Covert's Rope, Jute.....60&10&10&25
 Covert's Saddlery Works Halters.....35&45
 Covert's Saddlery Works Handy Web Halters.....35&45
 Covert's Saddlery Works Horse and Cattle Ties.....50&45

Hammers—
Handled Hammers—
 Atha Tool Co.....50&10
 Buffalo Hammer Co.....50&10
 Humason & Beckley.....50&10
 Terree.....40&10
 Cheney's Claw.....40&10
 Cheney's Machinist's & Riveting.....60&25
 C. Hammond & Son.....40&10
 Magnetic Tack, Nos. 1, 2, 3, 1.25, 1.50 & 1.75.....30&10
 Maydole's, List Dec. 1, '85.....25&10
 Peck, Stow & W. Co.....50&45
 Fayette R. Plumb.....40&10
 Artisan's Choice, A. E. Nail.....40&10
 Horseshoe Turning Hammers.....50
 Regular Y. & P., A. E. Nail.....50
 Other Hammers.....50&10
 Nelson Tool Works.....40&10
 Sargent's.....40&10
 Warner & Nobles, new list.....25&10

Heavy Hammers and Sledges—
 3 lb and under.....75&10
 5 lb.....75&10
 Over 5 lb.....85
 Wilkinson's Smiths.....10&11

Handcuffs and Leg Irons—
 See Police Goods.

Handles—
Cross-Cut Saw Handles—
 Atkins', new list.....40
 Champion.....15
 Ely's Perfection.....40
 Sensible.....40

Iron, Wrought or Cast—
 Barn Door, 70&10&25
 Bronze Iron Drop Latches, 70&10
 Chest and Lifting.....70&10
 Door or Thumb.....0
 Nos.....0 1 2 3 4
 Per doz.....\$0.90 1.00 1.08 1.35 1.50

Jap'd Store Door Handles—Nuts, 1.65, Plate, \$1.10; no plate, \$0.85.
 Roggin's Latches.....70&10

Wood—
 Auger, assorted.....gr 5.00
 Auger, large.....gr 7.00
 File, assorted.....gr 2.75
 Brad Axl.....gr \$2.00
 Apple Firmer Chisel, ass'd.....gr 6.00
 Apple Firmer Chisel, large.....gr 6.00
 Hickory Firmer Chisel, ass'd.....gr 4.00
 Hickory Firmer Chisel, large.....gr 5.00
 Socket Firmer Chisel, ass'd.....gr 3.00
 Socket Framing Chisel, ass'd.....gr 5.00
 Hammer, Hatchet, Axe, &c.....40&10
 Hoe, Rake, Shovel, &c.....60&10
 Pat. Auger, Douglass.....set \$1.25
 Pat. Auger, Ives.....30&10
 Pat. Auger, Swain.....30&10
 Saw and Plane.....40&10
 J. B. Smith & Co.'s Pat. File.....50

Hangers—
 Barn Door, New England.....70&10
 Barn Door, old pattern.....70&10
 Barry.....30
 Best Anti-Friction.....60&10
 Boss.....60&10
 Carrier Steel Anti-Friction.....50&10
 Champion.....60&10
 Chicago Anti-Friction.....30&10
 Climax Anti-Friction.....55
 Cincinnati Nos. 1, 2, 2.25; 3, 2.50; 4, 2.50
 Crescent.....60&10
 Cronk's Patent Steel Covered.....50&10
 Duplex (Wood Track).....60&10
 Economy, \$5.....60&10
 Hamilton Wrought Steel Track.....55
 Interstate.....50&10
 Kidder's.....50&10
 Lane's New Standard.....60&10
 Lane's Parlor.....40
 Lane's Standard.....50&10
 Lundy, Steel Parlor.....50&10
 Magic.....45&10
 Matchless.....50&10
 Moody.....45
 Moore's Baggage Car Door.....39
 Moore's Elevator.....39
 Moore's Railroad.....55
 Nickel, Steel, Nos. 0, 25; 1, 30; 2, 35; 3, 40; 4, 45; 5, 50; 6, 55; 7, 60; 8, 65; 9, 70; 10, 75; 11, 80; 12, 85; 13, 90; 14, 95; 15, 100; 16, 105; 17, 110; 18, 115; 19, 120; 20, 125; 21, 130; 22, 135; 23, 140; 24, 145; 25, 150; 26, 155; 27, 160; 28, 165; 29, 170; 30, 175; 31, 180; 32, 185; 33, 190; 34, 195; 35, 200; 36, 205; 37, 210; 38, 215; 39, 220; 40, 225; 41, 230; 42, 235; 43, 240; 44, 245; 45, 250; 46, 255; 47, 260; 48, 265; 49, 270; 50, 275; 51, 280; 52, 285; 53, 290; 54, 295; 55, 300; 56, 305; 57, 310; 58, 315; 59, 320; 60, 325; 61, 330; 62, 335; 63, 340; 64, 345; 65, 350; 66, 355; 67, 360; 68, 365; 69, 370; 70, 375; 71, 380; 72, 385; 73, 390; 74, 395; 75, 400; 76, 405; 77, 410; 78, 415; 79, 420; 80, 425; 81, 430; 82, 435; 83, 440; 84, 445; 85, 450; 86, 455; 87, 460; 88, 465; 89, 470; 90, 475; 91, 480; 92, 485; 93, 490; 94, 495; 95, 500; 96, 505; 97, 510; 98, 515; 99, 520; 100, 525; 101, 530; 102, 535; 103, 540; 104, 545; 105, 550; 106, 555; 107, 560; 108, 565; 109, 570; 110, 575; 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Britain, Graham & Mathes, list Jan. 1890.....60&10&10
Plate.....39&22
Barnes Mfg. Co.....40&40&10
Yale.....net prices
Deltz Flat Key.....36
Romer's Night Latches.....15
Brooklyn Latches.....15
Warner's Burglar Proof, # doz. \$5.00, 50%

Elevator—

Moore's.....39&22

Padlocks—

List June 10, 1891.....50&22
Norwich Lock Mfg. Co., old list.....50&22
Yale Lock Mfg. Co.'s.....net prices
Eagle.....40
Eureka, Eagle Lock Co.....40&22
Romer's Nos. 0 to 91.....30
Romer's Scandinavian, & Co., Nos. 100 to 505.....15
A. E. Deltz.....40
Champion Padlocks.....40
Hotchkiss.....30
Star.....60
Horseshoe.....# doz \$9, 50&10&10
Barnes Mfg. Co.....40&40
Rock's.....30
Scandinavian.....90&50
E. T. Fram's Keystone Scandinavian.....1010 line.....90&40
120 line.....90&25
100 line.....65
510 line.....70&10
225, 610 and 209 lines.....50&5
All other numbers.....50&5
Ames Sword Co. up to No. 150.....40
Ames Sword Co. above No. 150.....50
Slaymaker, Barry & Co.....No. 1010 line.....90&50
No. 41 line.....90
No. 81 line.....90
No. 21 line.....80

Sash, &c.—

Clark's No. 1, \$10; No. 2, \$8 gr.....39&22
Ferguson's.....39&22
Victor.....60&10&22
Walker's.....10
Attwell Mfg. Co.....25&33
Reading.....60&10&60&10&10
Hammond's Window Springs.....40
Common Sense, Jap'd, Cop'd and Br'zed.....gr \$4.00
Common Sense, Nickel Plated.....gr \$1.00
Universal.....30
Kempshall's Gravity.....60
Kempshall's Model.....60&10&10
Corbin's Daisy, list Feb. 15, 1888.....70
Payson's Perfect.....60&10&10
Hugulin's Sash Balances.....25&32
Hugulin's New Sash Locks.....25&32
Ives' Patent.....60&10&60&10&10
Fish (Liesche's pat.), No. 100, gr.....50
No. 105, gr.....50
Davis Bronze, Barnes Mfg. Co.....60
Champion Safety list January, 1893, 70&5
Security.....70
Giant, list Jan., 1892.....70
Wolcott's.....60&10&5
Monarch.....60

Lumber Tools—

See Tools, Lumber.

Lustro—

Four-ounce bottles.....# doz, \$1.75; 70 gross.....\$17.00

Machines.**Boring—**

Without Augers. Upright. Angular.
Douglas.....\$5.50 \$6.75.....60
Snell's, Rice's Pat.....5.50 6.75, 40&10&10
Jennings.....5.50 6.75, 50&50&5
Other Machines.....2.25 2.50.....25
Phillip's Patent with Augur.....7.00 7.50.....25
Millers Fuller.....7.50.....25
Boss, Carpenters' 3.60
Boss, Ship Blids' 3.85

Fluting—

Knox, 4 1/2-inch Rolls.....\$3.25 each } 35%
Knox, 6-inch Rolls.....\$3.60 each }
Eagle, 3 1/2-inch Rolls, \$2.15.....35%
Eagle, 4 1/2-inch Rolls, \$2.85.....35%
Crown, 4 1/2 in., \$3.50; 6 in., \$4.00; 8 in., \$5.00 each.....35%
Crown Jewels.....\$3.50 each, 35%
American, 5 in., \$3.00; 6 in., \$3.40; 7 in., \$4.50 each.....35%
Domestic Fluter.....each, \$1.50
Geneva Hand Fluter, White Metal, # doz \$12, 25%
Crown Hand Fluter, No. 1, \$15.00; 2, \$12.50; 3, \$10.00.....\$8.25
Shepard Hand Fluter, No. 85, per doz \$15.50.....40%
Shepard Hand Fluter, No. 110, # doz \$11.00.....40%
Shepard Hand Fluter No. 95, # doz \$3.00.....40%
Combined Fluter and S. Iron.....# doz \$15.00.....30%

Holting—

Moore's Hand Holst, with Lock Brake, 20%
Moore's Anti-Friction Differential Pulley Block.....20%
Moore's Rope Differential Pulley Block.....60%
Energy Mfg. Co.'s.....25%
See also Blocks.

Washing—

Anthony Wayne, # doz, No. 1, \$42; No. 2, \$36; No. 3, \$42.....# doz \$36.00
Wayne American.....# doz \$39.00
Western Star # doz, No. 2, \$36; No. 3 \$39
Weissel.....# doz \$54.00
Fair and Square.....# doz \$42.00

Mallets—

Hickory.....20&10&20&10&10
Lignumvita.....20&10&20&10&10
B. & L. Block Co., Hickory & L. V.....30&30&10

Mattocks—Regular list.

60&10&60&10&5

Measures—

Standard Fibreware, No. 1, peck # dozen, \$3.50; 1/2-peck, \$3.00

Meat Cutters—

See Cutters, Meat.

Menders, Harness—

Per doz.....\$2.00

Milk Cans—See Cans, Milk.**Mills—****Coffee—**

Box and Side, list Jan. 1, 1888, 60&60&25
Net prices are often made which are lower than above discount.
American, Enterprise Mfg. Co., list Jan. 17, 1893.....20%
The Swift, Lane Bros.....30%
Waddell's New Box Mills, Ideal Brand, New List.....60%

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Best Machines: 10-in., \$4; 12-in., \$4.50; 14-in., \$5; 16-in., \$5.50; 18-in., \$6.
Low-Grade Machines:
10-in., \$3; 12-in., \$3.25 14-in., \$3.50 each

Muzzles—

Safety.....# doz, \$3.00, 25%

Nails—

Cut and Wire. See Trade Report.
Wire Nails, Papered.....85&5
Association list, May 1, '92.....85&5
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos. 6 7 8 9 10
Putnam.....23¢ 21¢ 20¢ 19¢ 18¢.....15%
American.....23¢ 21¢ 20¢ 19¢ 18¢.....net
Ausable.....28¢ 26¢ 25¢ 24¢ 23¢.....40&5&22
Clinton, Fin., 104 174 164 154 144.....30&5
Essex.....28¢ 26¢ 25¢ 24¢ 23¢.....40&10&50

Lyra.....91¢ 91¢ 91¢ 91¢ 91¢.....net
Snowden.....91¢ 91¢ 91¢ 91¢ 91¢.....net
Standard.....23¢ 21¢ 20¢ 19¢ 18¢.....35%
Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢.....25%
Northwestern.....25¢ 23¢ 22¢ 21¢ 20¢.....25&25&5
C. B. K.....25¢ 23¢ 22¢ 21¢ 21¢.....40%
A. C.....25¢ 23¢ 22¢ 21¢ 21¢.....40&10

Maud S.....25¢ 23¢ 22¢ 21¢ 21¢.....50&10&5
Champlain.....28¢ 26¢ 25¢ 24¢ 23¢.....40&5&22
Champion.....25¢ 23¢ 22¢ 21¢ 20¢.....10&10&5
Capewell.....19¢ 18¢ 17¢ 16¢ 15¢.....10&5
Anchor.....23¢ 21¢ 20¢ 19¢ 18¢.....35%
Western.....23¢ 21¢ 20¢ 19¢ 18¢.....50%
Empire Bronzed.....19&14¢

Picture—

Brass Head, Sargent's list.....60&60&10
Brass Head, Combination list.....50&10
Porcelain Head, Sargent's list.....50&10&10
Porcelain Head, Combination list.....40&10
Niles' Patent.....40%

Nail Pullers—See Pullers, Nail.**Nail Sets—See Sets, Nail.****Nut Crackers—**

See Crackers, Nut.

Nuts—List Dec. 18, 1889.

Square, Hex.
Hot Pressed.....5.80 6.50 off list
Cold Punched.....5.00 6.10 off list
In packages of 100 lb, add 1-10¢ # lb; in packages less than 100 lb, add 1/4¢ # lb, net.
Oakum—
Best or Government.....# lb 6¢@71/2¢
U. S. Navy.....# lb 5¢@6¢
Navy.....# lb 5¢@6¢
Oil Tanks—See Tanks, Oil.
Oilers—
Zinc and Tin......55&10&70&5
Brass and Copper.....60&10&50&10&5
Malleable, Hammers' Improved, No. 1, \$3.80; No. 2, \$4.00; No. 3, \$4.40 # doz.....10&10&5
Malleable, Hammers' Old Pattern, same list.....45%
Prior's Pat. or "Paragon" Zinc.....60&10&10
Prior's Pat. or "Paragon" Brass.....50%
Olmstead's Tin and Zinc.....60%
Olmstead's Brass and Copper.....50%
Broughton's Zinc.....60%
Broughton's Brass.....50%
Steel, Draper & Williams.....50%
Wilnot & Hobbs Mfg. Co., Steel Anti-Rust.....60%

Openers, Can—

Messenger's Comet.....# doz \$3.00, 25%
American.....# gross \$2.75 to \$3.00
Duplex.....# doz 25¢, 15¢ to 20¢
Lyman's.....# doz \$3.75, 20¢
No. 5, French.....# doz \$2.25, 50&60
No. 5, Iron Handle.....# gr \$8.00, 45&50
Eureka.....# doz \$2.50, 10%
Sardine Scissors.....# doz \$2.75 to \$3.00
Star.....# doz \$2.75
Sprague, No. 1, \$2.50; 2, \$2.25; 3, \$2.50; 4, \$2.75.....# doz \$2.75

Excelsior, No. 1 \$2.50; No. 2, \$1.50.....40%
World's Best # gross, No. 1, \$12.00; No. 2, \$24.00; No. 3, \$36.00.....50&10
Universal, # doz \$3.00.....55&5
Domestic, # doz \$2.00.....45%
Champion, # doz \$2.00.....50%
Moore's.....# doz \$2.00.....70%

Packing, Steam—

Rubber—
Standard, fair quality.....70&70&10
Inferior quality.....75&80
Extra.....90&90&5
N. Y. B. & P. Co., Standard.....60%
N. Y. B. & P. Co., Empire.....60%
N. Y. B. & P. Co., Salamander.....25%
Jenkins' Standard, # lb 80¢.....25&25&5

Miscellaneous—

American Packing.....10¢@11¢ # lb
Russia Packing.....14¢ # lb
Italian Packing.....13¢@14¢ # lb
Cotton Packing.....15¢@17¢ # lb
Jute.....7¢@8¢ # lb

Pails—**Creamery—**

S. S. & Co. 18-qt., \$7.00; 20-qt., \$7.25 # doz.....5¢

Galvanized—

Quarts 10 12 14
Hill's Light Weight, # doz. \$2.75 3.00 3.25
Hill's Heavy Weight, # ds. 3.00 3.25 3.75
Sidney Shepard & Co.....2.50 2.75 3.00
Central Stamping Co.....2.50 2.75 3.00
Iron Clad.....2.50 2.75 3.00
Fire Buckets, No. 2, 14 qt., # doz \$4.80 5.25 5.50
Buckets—See Well Buckets.

Indurated Fiber Ware

Star Pails, 12 qt.....# doz \$4.20
Milk, 14 qt.....# doz \$5.40
Stable, 14 qt.....# doz \$5.40
Fire Pails, deo.....# doz \$4.80
Fire Pails, round bottom.....# doz \$5.40

Standard Fiber Ware—

Water Pails, 12 qt., # doz. \$3.15 3.75
Dairy Pails, 14 qt., # doz. 3.75 4.25
Fire Pails, No. 2, 14 qt., # doz 4.25 4.75
Sugar Pails.....5.00 5.50
Horse Pails.....4.00
Buggy Pails.....3.00
Stop Jars (bal. trap).....7.50 8.50
Chamber Pails, 14 qt.....6.00 7.00

Pans—**Dripping—**

Small sizes.....# lb 5¢
Large sizes.....# lb 5¢
Silver & Co. (Covered).....# lb 5¢

Fry—

Standard List:
No. 1.....1 2 3 4
No. 2.....\$3.00 \$3.75 \$4.25 \$4.75 \$5.25
No. 3.....5 6 7 8 9
doz.....\$6.00 \$7.00 \$8.00 \$9.00
Polished, regular goods.....75¢ to 75¢ to 10¢
Acme Fry Pans.....60&5

Dust—

Steel Edge, No. 1.....# doz \$1.75

Roasting and Baking—

Columbian, S. S. & Co.: Nos. 10, \$2; 20, \$2.50; 30, \$2.50 each.....60&10

Paper and Cloth—

Sand and Emery—
List April 19, 1888.....50&10&50&10&10
Sibley's Emery and Crocus Cloth.....30%

Parers—**Apple—**

Advance.....# doz \$4.75
Baldwin.....# doz 5.25
Bonanza.....each 5.00
Daisy.....# doz 4.00
Dandy.....each 7.50
Eclipse.....# doz 4.00
Eureka, 1888.....each 16.00
Family Bay State.....# doz 12.00
Favorite.....# doz 5.00
Gold Medal.....# doz 4.00
Ida.....# doz 4.00
Improved Bay State.....# doz 27.00 to 30.00
Little Star.....# doz 4.50
Monarch.....# doz 13.50
New Lightning.....# doz 5.50
Oriole.....# doz 4.00
Penn.....# doz 3.00
Perfection.....# doz 4.00
Pomona.....# doz 4.00
Rocking Table.....# doz 6.00
Turn Table.....# doz 4.50
Victor.....# doz 13.50
Waverly.....# doz 4.00
White Mountain.....# doz 4.00
Reading 72.....# doz 4.25
Reading 78.....# doz 7.00

Potato—

White Mountain.....# doz \$4.50
Hudson Combination.....# doz \$5.50
Hoosier.....# doz \$13.50
Saratoga.....# doz \$5.50

Pencils, Soapstone—

See Crayons.

Pickers, Fruit—

Prize Fruit Pickers.....50%

Picks—

Railroad or Adze Eye, 5 to 6, \$12.00; 6 to 7, \$13.00.....60&10&50&10&10&5

Picture Nails—

See Nails, Picture.

Pinking Irons—

See Irons, Pinking.

Pins—

Humason, Beckley & Co.'s.....60&10
Sargent & Co.'s, \$17 and \$18.....60&10
Peck, Stow & W. Co.....50&10&50&10&5
Escutcheon—
Iron, list Nov. 11, 1885, 50&10&50&10&5
Brass.....60&60&5

Pipe, Wrought Iron—

List April 13, 1893.
1 1/2 and under, Plain.....57 1/2 to 101
1 1/2 and under, Galv.....50 to 101
1 1/2 and over, Plain.....87 1/2 to 101
1 1/2 and over, Galv.....57 1/2 to 101
Boiler Tubes, list Oct. 24, 1892.....55 to 104
Casing, list Nov. 18, 1892.....52 to 105
Inserted Joints Casing, list Nov. 18, 1892.....47 1/2 to 55
Steel Boiler Tubes.....27 1/2 to 55
Cold Drawn Seamless Steel Tubing.....50%

Planes and Plane Irons—

Wood Planes—
Molding.....40&10
Bench, First quality.....45 to 105
Bench, Second quality.....50 to 105
Bailey's (Stanley R. & L. Co.).....50&105
Iron Planes—
Bailey's (Stanley R. & L. Co.).....50&105
Miscellaneous Planes (Stanley R. & L. Co.).....25 to 105
Steers' Iron Planes.....50 to 50&5
Meriden Hal. Iron Co.'s.....50 to 50&5
Davis' Iron Planes.....50 to 50&5
Birmingham Plane Co.....60 to 60&5
Gage Tool Co.'s Self-Setting.....20 to 105
Chaplin's Iron Planes.....50 to 50&5
Sargent's.....60 to 60&105
Standard Tool Co.....50 to 50&5

Plane Irons—

Butcher's.....\$5.00 to \$5.25 to \$5.50
Buck Bros.....50%

Aburn Thistle......30&10&30&10&10
Ohio......30&10&30&10&10
Sandusky......25%
L. & J. White......25%
Stanley R. & L. Co......50&105

Plates—

Felice.....# lb 6¢@8 1/2¢

Pliers and Nippers—

Button's Patent.....60%
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in., \$21.00 # doz.....40%
Humason & Beckley Mfg. Co. 50&50&10
Lindsay's Giant.....39 1/2¢
Gas Pliers.....60%
Gas Pliers, Custer's Nickel Plated.....60&5
Eureka Pliers and Nippers.....40%
Russell's Parallel.....25%
P. S. & W. Cast Steel.....50 to 50&5
P. S. & W. Finners' Cutting Nippers, add 6%.....10%
Carew's Pat. Wire Cutters.....20%
Morrill's Parallel, # doz, \$12.00.....30&5
Cronk's 8 in., \$15.00; 10 in., \$20.00.....20%
Cronk's Button Pattern.....50&10&60%
Cronk's Carrier Pliers.....60 to 60&5

Plumbs and Levels—

Regular List.....75&10&75&10&10
Stanley's Duplex.....20 to 105
Stanley's Handy.....20 to 105
Disston.....40 to 105
Cook's.....40 to 105
Pocket Levels.....70&10&70&10&10
Davis Iron Levels.....30%
Davis Inclinoimeters.....10&10

Poachers, Egg—

Buffalo Steam Egg Poachers, # doz. No. 1, \$6.00; No. 2, \$9.00.....39 1/2¢
Silver & Co., 6-Ring, # doz, \$4.00; 3-Ring.....\$2.00

Pokes, Animal—

Bishop's I. X. L.....# doz \$6.00
Bishop's Monarch.....# doz \$4.50
Bishop's Pioneer.....# doz \$4.00
Bishop's American.....# doz \$3.00
Eagle, Double Stale.....# doz \$5.75
Eagle, Single Stale.....# doz \$3.75
Buckeye, Single Stale.....# doz \$2.75
Bolding.....# doz \$6.00
Metallic Horse Poke.....# doz \$6.00

Police Goods—

R. I. Tool Co., Handcuffs, \$15.00 # doz 10%
R. I. Tool Co., Leg Irons, \$25.00 # doz 10%
Towers.....25%
Daley's Improved Handcuffs; 2 Hands, Polished, # doz, \$48.00; Nickeled, \$57.00; 3 hands, Polished, # doz, \$72.00; Nickeled, \$84.00.....25%
J. P. Lovell's Police Goods.....25%

Polish—

Metal—
Prestoline.....30%
Prestoline Paste.....39 1/2¢
Gaston's Silver Compound.....39 1/2¢

Stove—

Joseph Dixon's.....# gro, \$6.00, 10%
Gem.....# gro, \$4.50, 10%
Gold Medal.....# gro, \$8.00, 25%
Lustro.....# gro, \$4.75
Ruby.....# gro, \$5.75
Rising Sun.....# gro, \$5.00
Dixon's Plumbago.....# gro, \$8.00
Boynton's Noon Day.....# gro, \$13.00
Parlor Pride Stove Enamel, # gro, Yates' Liquid, 2 3 5 10 gal # gal, \$0.80 70 80 50
Yates Standard Paste Polish, 10 m cans, 12 1/2¢

Jet Black.....# gro \$5.50
Japanese.....# gro \$3.50
Fireside.....# gro \$2.50
Diamond O. K. Enamel.....# gro \$10.00
Bonnell's Liquid Stove Polish, # gro \$9.00
Bonnell's Paste Stove Polish, # gro \$8.00
Black Eagle Benzine Paste, 5 and 10 m cans.....12 1/2¢
Black Jack Water Paste, 5 and 10 m cans.....12 1/2¢
Nickel Plate Paste.....# gro \$6.00
Crown Paste.....# gro \$7.20
Crown Paste in 5 and 10 m pails, # m 12¢
Black Flag.....# gro \$7.20
Black Flag, 5 and 10 m pails, # m 12¢
Black Flag, Liquid, in bottles, # gro \$8.00
Diamond Rock Liquid Cleaner.....# gro \$10 20

Raven Liquid, 6 oz. bottles.....# gro \$9.00
Raven Liquid, 8 oz. bottles.....# gro \$9.00
Raven Water Polish, large boxes.....# gro \$7.20
Raven Paste in 5 lb. pails (cases of 6 pails), # m 10¢

Poppers, Corn—
Round or Square,
1 qt.....# doz \$1.00; # gr \$8.00
1 1/2 qt.....# doz \$1.00; # gr \$9 09
2 qt.....# doz \$1.50; # gr \$14.09

Post Hole and Tree Augers and Diggers—
See Diggers, Post Hole, &c.

Potato Parers—

See Parers, Potato.

Pots—

Glue—
Tinned.....40&10&40&10&5
Enameled.....40&10&40&10&5
Family, Howe's "Eureka".....40%
Family, L. F. C.'s "Handy".....50%

Powder—

In Canisters—

Pullers Nail—

Scranton. \$ doz., \$18.00, 38¢
 Giant, No. 1. \$ doz., \$18.00, 10¢
 Giant, No. 2. \$ doz., \$18.00, 10¢
 Pelican. \$ doz., \$9.00, 25¢
 Eclipse. \$ doz., \$24.00, 40¢
 Economy. \$ doz., \$6.00

Pulleys—

Hot House, Awning, &c. 60¢@70¢
 Japanned Screw. 80¢@10¢
 Brass Screw. 70¢
 Japanned Side. 60¢@10¢
 Moore's Side, Anti-Friction. 50¢
 Moore's Ceiling or End, Anti-Friction. 40¢
 Moore's Dumb Waiter, Anti-Friction. 60¢
 Moore's Electric Light. 30¢
 Japanned Clothes. 60¢@10¢
 Hay Fork, Solid Eye. \$4.00; Swivel. \$4.50
 Hay Fork, "Anti-Friction," 5 in. solid. \$5.70
 Hay Fork, "F" Common and Patent Bushed. 20¢
 Hay Fork, Tarred Rod Iron. 20¢
 Hay Fork, Reed's Self-Lubricating. 60¢
 Hay Fork, Moore's Anti-Friction 5 in. Wheel. \$ doz., \$12.00, 40¢
 Shade Rack. 45¢
 Tackle Blocks—See Blocks.
 Shepard's Niagara, No. 25. \$ doz 23¢ net Sash (Auger Mortise).
 Common Sense. 60¢
 Empire. 60¢
 Ideal, Nos. 2, 4, 10 & 15. } 40¢ less 1¢
 Acme. } doz net.
 Star. }
 On bbl. lots extra 5¢.
 Ideal, Nos. 25 and 65. \$ doz. 22¢ net.

Pumps—

Clister, Best Makers. 60¢@60¢10¢
 Pitcher Spout, Best Makers. 67¢@70¢
 Pitcher Spout, Cheaper G'ds. 75¢@75¢10¢

Punches—

Saddler's or Drive, good. \$ doz., 60¢@65¢
 Bemis & Call Co.'s Cast Steel Drive. 50¢@55¢
 Bemis & Call Co.'s Springfield Socket. 60¢
 Spring, good quality. \$ doz., \$2.50@2.60
 Spring, Leach's Pat. 50¢@55¢
 Bemis & Call Co.'s Spring. 50¢@55¢
 Bemis & Call Co.'s Check. 55¢
 Solid Tinnings, P., S. & W. Co., \$ doz. \$1.44
 Tinnings' Hollow Punches, P., S. & W. Co. 20¢@25¢
 Rice Hand Punches. 15¢
 Avery's Revolving. 15¢
 Avery's Sawset and Punch—See Sawsets.
 Niagara Hollow Punches. 20¢@25¢
 Niagara Solid Punches. 55¢

Rail—

Sliding Door, Wt. Brass. \$ doz., 35¢, 40¢
 Sliding Door, Bronzed Wt. Iron. \$ doz., 40¢
 Sliding Door, Iron, Painted. \$ ft., 4¢, 10¢
 Barn Door, Light. In. \$ ft., 3¢
 Per 100 feet. \$2.00 2.50 3.10, 10¢
 B.D. for N. E. Hangers—
 Small. Med. Large.
 Per 100 feet. \$3.15 2.70 3.25 Net
 Terry's Steel Rail, 7 1/2 ft. foot. \$ doz., 50¢@55¢
 Carrier, double braced, Steel Rail, 7 ft. foot. \$ doz., 30¢@40¢
 Lundy Parlor Door, Planed Edge, \$ ft., 7¢
 Moore's Steel Rail. 25¢@10¢
 Moody Steel Rail \$ ft., 6¢

Rakes—

Cast Steel, Association G'ds. 70¢@70¢@5¢
 Cast Steel, outside G'ds. 70¢@70¢@5¢
 Malleable. 70¢@70¢@5¢
 Gibbs' Lawn Rake. \$ doz., \$4.90
 Gibbs' Canton Lawn Rake. \$ doz., \$3.75
 Gibbs' Acme Lawn Rake. \$ doz., \$4.75
 Gibbs' Favorite Lawn Rake. \$ doz., \$3.90
 Gibbs' Crown Lawn Rake, No. 1. \$ doz., \$4.90; No. 2, \$3.50
 Oneida Lawn Rake. \$ doz., \$6.00
 Fort Madison Prize Bow Brace and Peerless. 65¢
 Fort Madison Steel Tooth Lawn Rake. \$6.00

Razors—

J. R. Torrey Razor Co. Net prices
 Wostenholm and Butcher, \$10 to 20. 10¢
 Jordan's AAAI, new list. Net prices
 Jordan's Old Faithful, new list. Net prices
 Galvanic. \$ doz., \$15.00
 Electric Cutlery Co. Net prices
 Campbell Cutlery Co. 60¢

Razor Strops—

See Strops, Razor.

Registers—

Moore's Japanned. 75¢
 Moore's Electroplated. 75¢
 Moore's Broiled Finishes. 70¢
 Moore's Solid Bronze. 65¢
 Moore's Stove Pipe. 35¢

Rings and Ringers—**Bull Rings—**

Union Nut Co. 55¢
 Sargent's. 75¢@10¢
 Hotchkiss' low list. 30¢
 Humason, Beckley & Co.'s. 70¢@10¢
 Peck, Stow & W. Co.'s 50¢@10¢@50¢@10¢
 Elrich Hdw. Co., White Metal, low list. 50¢@50¢10¢

Hog—

Top of the Hill Ringers. \$ doz \$2.00
 Top of the Hill Ringers. \$ doz \$1.25
 Hill's Improved Ringers. \$ doz \$1.25
 Hill's Old Style Ringers. \$ doz \$1.12 1/2
 Hill's Tongues. \$ doz \$3.00
 Hill's Rings. \$ doz bxs \$1.00
 Perfect Rings. \$ doz bxs \$1.50
 Perfect Rings. \$ doz \$2.15@2.25
 Blair's Hog Ringers. \$ doz \$2.00
 Blair's Hog Ringers. \$ doz \$0.90@1.25
 Champion Ringers. \$ doz \$2.00
 Champion Rings, Double. \$ doz \$2.25
 Brown's Ringers. \$ doz \$2.00
 Brown's Rings. \$ doz \$1.15@1.25
 Electric Hog Ringers. \$ doz \$1.50
 Electric Hog Ringers. \$ doz \$2.00
 Major Rings. \$ doz \$2.00
 Major Ringers. \$ doz \$2.00

Rivets and Burrs—

Norway Iron, list Nov. 17, '87. 60¢@10¢
 Second quality. 70¢
 Copper. 60¢@60¢10¢
 Copper Iron, Betina Brand. 50¢@5

Rivet Sets—See Sets.**Roasting and Baking Pans—See Pans, Roasting and Baking.****Rods—**

Stair, Brass. 25¢@30¢
 Stair, Black Walnut. \$ doz 40¢

Rollers—

Barn Door, Sargent's list. 60¢@10¢10¢
 Acme Moore's Anti-Friction. 55¢
 Union Barn Door Roller. 70¢
 Moore's Barn Door Stay. 50¢
 Thompson Mfg. Co.'s Lawn Rollers. 30¢

Rope—The following prices are f. o. b. New York or factory, and are shaded 1/4¢ on large lots; terms, 1 1/4% for cash.

Manila, 7-16 in. diam. and larger. 8 @ 84¢
 Manila, 1/4 and 3/8 in. 8 @ 84¢
 Manila, 1/2 and 3/4 in. 8 @ 84¢
 Manila, 1/2 and 3/4 in. 8 @ 84¢
 Sisal, 7-16 in. and larger 5 1/2 @ 84¢
 Sisal, 1/4 and 3/8 in. 7 1/4 @ 74¢
 Sisal, 1/2 and 3/4 in. 6 1/4 @ 74¢
 Sisal, Tarred Rope. 5 1/2 @ 54¢
 Sisal, Medium Lath Yarn. 5 1/2 @ 54¢
 New Zealand, 7-16 in. and larger. 5 1/2 @ 54¢
 New Zealand, 1/4 inch. 5 1/2 @ 54¢
 New Zealand, 1/2 and 3/4 in. 5 1/2 @ 54¢
 New Zealand, Hay Rope. 5 1/2 @ 54¢
 New Zealand, Tarred Rope. 5 @ 54¢
 Cotton Rope. \$ doz 24¢@26¢
 Jute Rope. \$ doz 24¢@26¢

Wire—

List February, 1892. All kinds. 45¢

Rules—

Boxwood. 80¢@10¢@10¢@80¢@10¢@10¢
 Ivory. 50¢@10¢
 Starrett's Steel Rules and Straight Edges. 25¢@10¢

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—**

See Paper and Cloth.

Sash Cord—See Cord, Sash.**Sash Locks—See Locks, Sash.****Sash Weights—**

See Weights, Sash.

Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.**Saws—**

Note.—Extra 5¢@10¢ often given.

Diston's Circular. 45¢@45¢5¢
 Diston's Cross Cut, list Jan. 1, '93. 40¢@10¢
 Diston's Hand. 25¢
 Woodrough & McParlin.
 Hand, Panel and Rip. 25¢@10¢
 Cross Cuts, list Jan. 1, 1893. 45¢@10¢
 Hand, Panel and Rip. 30¢@10¢
 Cross Cuts, list Jan. 1, 1893. 45¢@10¢
 Atkins' Circular. 50¢@10¢
 Atkins' Cross Cuts, new list. 40¢
 Atkins' Mulay, Mill and Drag. 50¢@10¢
 Atkins' One-Man Saw. 40¢
 Atkins' Circular Saws. 40¢
 Peace Hand Panel and Rip. 25¢@25¢5¢
 Peace Cross Cuts, list Jan. 1, '93. 45¢@10¢
 Richardson's Circular and Mill. 45¢@45¢5¢
 Richardson's X Cuts, list Jan. 1, '93. 45¢@10¢
 Richardson's Hand, &c. 25¢@25¢5¢
 C. E. Jennings & Co.'s. 25¢
 Simonds' Circular Saws. 45¢@45¢5¢
 Simonds' Crescent Ground Cross Cuts. 30¢
 Simonds' Gang, Mill, Mulay and Drag Saws. 45¢@45¢5¢

Hack Saws—

Griffin's, complete. 40¢@10¢50¢
 Griffin's Hack Saw Blades. 40¢@10¢50¢
 Star Hack Saws and Blades. 25¢
 Eureka and Crescent. 25¢

Scroll—

Lester, complete, \$10.00. 25¢
 Rogers, complete, \$4.00. 25¢
 Barnes' Rollers and Cal Makers. 25¢
 Barnes' Scroll Saw Blades. 35¢

Saw Frames—

See Frames, Saw.

Saw Sets—See Sets, Saw.**Saw Tools—See Tools, Saw.****Scales—**

Hatch, Counter, No. 171, good quality. \$ doz \$18.00@19.00
 Hatch, Tea, No. 161. \$ doz \$6.50@7.20
 Union Platform, Plain. \$2.10@2.20
 Union Platform, Striped. \$2.40@2.50
 Chatillon's Grocers' Trip Scales. 25¢
 Chatillon's Eureka. 25¢
 Chatillon's Favorite. 40¢
 Family Turnbolls. 30¢@30¢10¢
 Reible Bros' Platform. 40¢

Scale Beams—

See Beams, Scale.

Scissors, Fluting—**Scrapers—**

Adjustable Box Scraper (S. R. & L. Co.). \$6.00
 Box, 1 Handle. \$ doz \$2.00
 Box, 2 Handle. \$ doz \$3.00@3.10
 Double Box and Ship. 20¢@10¢
 Fox, Common. 50¢@10¢60¢
 Ship, Common. \$ doz \$3.50
 Ship, R. I. Tool Co. 10¢

Screen Window and Door

Frames—See Frames

Screw Drivers—

See Drivers, Screw

Screws—**Bench and Hand—**

Bench, Iron. 55¢@10¢55¢@10¢10¢
 Bench, Wood, Beech. \$ doz \$2.25
 Bench, Wood, Hickory. 20¢@10¢
 Hand, Wood, Beech. 25¢@10¢25¢@10¢5¢
 Hand, Hard Rapids, list. 35¢

Coach, Lag and Hand-Rail—

Lag, Blunt Point, list Jan. 1, 1890. 80¢@10¢80¢25¢
 Coach and Lag, Gimlet Point, list Jan. 1, 1890. 80¢@10¢80¢20¢
 Hand Rail, Sargent's. 70¢@10¢
 Hand Rail, E. & B. Mfg. Co. 70¢@10¢75¢
 Hand Rail, Am. Screw Co. 75¢

Jack Screws—

Jack Screws, Millers Falls list. 50¢@50¢10¢
 Jack Screws, P., S. & W. 35¢
 Jack Screws, Sargent. 70¢
 Jack Screws, Stearns'. 40¢@40¢10¢

Cork—

Humason & Beckley Mfg. Co. 40¢@10¢50¢
 Williamson's. 35¢@35¢45¢
 Williamson's Forged Worm, Applewood Handle, \$ doz., \$5.00; Rosewood, \$5.50. 10¢
 Detroit Cork Screw Co. 33¢

Machine—

Flat Head Iron. 65¢
 Round Head Iron. 60¢

Wood—

List January 1, 1891.
 Flat Head Iron. 70¢
 Round Head Iron. 65¢
 Flat Head Brass. 70¢
 Round Head Brass. 65¢
 Flat Head Bronze. 65¢
 Round Head, Bronze. 65¢
 Rogers' Drive Screws. 82¢

Scroll Saws—See Saws, Scroll.**Scythes—**

Grain. 40¢@50¢40¢10¢
 Grass. 40¢@10¢50¢

Scythe Snaths—

See Snaths, Scythe.

Sets—

Awl and Tool—
 Aiken's Set, Awls and Tools, No. 20, \$ doz \$10.00. 60¢@60¢5¢
 Fray's Adj. Tool Hds., Nos. 1, \$12; 2, \$18; 3, \$12; 4, \$9. 45¢
 Millers Falls Adj. Tool Hds., No. 1, \$12; No. 4, \$12; No. 5, \$18. 25¢
 Henry's Combination Haft. \$ doz \$6.50
 Stanley's Excelsior: No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50. 30¢@10¢
 Common Brad Sets, No. 42, \$10.50; No. 43, \$12.50. 70¢@10¢5¢

Nail—

Square. \$ gr. \$4.00@4.25
 Round. \$ gr. \$3.25
 Buck Bros. 27¢
 Cannon's Diamond Point. \$ gr. \$12, 20¢

Rivet—

Regular list. 70¢

Saw—

Stillman's Genuine. \$ doz \$5.00@7.75, 40¢@5¢
 Stillman's Pattern, Hand, \$ doz \$3.25. 40¢@5¢
 Cross Cut, \$5.50. 55¢@55¢10¢
 Common Lever. \$ doz \$2.00, 45¢@50¢
 Hammer, Hotchkiss. 40¢@20¢
 No. 1, \$16.00. 40¢@20¢
 Nos. 3 and 4, Cross Cut, \$23.00. 40¢@20¢
 No. 5, Mill, \$31.00. 40¢@20¢
 No. 10, \$15.50. 40¢@20¢
 Leach's, No. 0, \$3.00; No. 1, \$15. 15¢@20¢
 Nash's. 20¢@10¢40¢
 Hammer, Hotchkiss. \$5.50, 10¢
 Hammer, Bemis & Call Co.'s new Pat. 45¢
 Bemis & Call Spring Hammer. 30¢@5¢
 Bemis & Call Co.'s Plate. 20¢
 Bemis & Call Co.'s Cross Cut. 30¢@5¢
 Aiken's Genuine. \$13.00, 60¢@60¢10¢
 Aiken's Imitation. \$ doz \$3.00@3.25
 Hart's Pat. Lever. \$ doz \$3.25
 Diston's Star. 25¢
 Leopold. 40¢@10¢50¢
 Atkin's Lever. \$ doz No. 1, \$6.00
 Atkin's Criterion. \$ doz No. 1, \$6.00
 Croissant (Keller), No. 1, \$15.00; No. 2, \$24.00. 40¢@10¢50¢
 Sargent's Set and Punch. \$ doz \$7.00
 Kohler's Royal. \$ doz \$12.00
 Kohler's Giant Royal. \$ doz \$3.00
 Lloyd's Acme. \$ doz \$15, 40¢10¢
 Taintor Positive. \$ doz \$18, 50¢

Sharpeners, Knife—

Applewood Handles. \$ doz \$6.00, 40¢
 Rosewood or Cocobola. \$ doz \$9.00, 40¢

Shaves, Spoke—

Iron. 45¢
 Wood. 30¢
 Bailey's (Stanley R. & L. Co.). 40¢@10¢
 Stearns'. 30¢@10¢
 Cincinnati. 25¢@10¢
 Goodell's \$ doz \$9.00. 25¢

Shears—

American (Cast) Iron. 75¢@10¢75¢@10¢5¢
 Barnard's Lamp Trimmers. \$ doz \$3.75
 Seymour's, list Dec. 1881. 60¢@10¢10¢60¢@10¢10¢5¢
 Heinisch's, list Dec. 1881. 60¢@10¢10¢60¢@10¢10¢5¢

Heinisch's Tailor's Shears. 35¢@4¢

Cast Steel Trimmers. 80¢@80¢10¢
 Second quality. 80¢@10¢80¢10¢10¢
 Acme Cast Shears. 10¢@10¢
 Diamond Cast Shears. 10¢
 Clipper. 10¢@10¢
 Victor Cast Shears. 75¢@10¢75¢@10¢5¢
 Howe Bros. & Hubert, Solid Forged. 40¢
 Hatch Cutlery Co., Solid Steel Forged. 60¢
 Davenport Cutlery Co. 60¢@60¢10¢
 Clauss brand, Japanned, same list. 70¢
 Clauss brand, Nickeled, same list. 60¢
 Galvanic 3/4 to 9 in. \$ doz \$1.00 \$ inch Electric Cutlery Co. Net
 Campbell Cutlery Co., Jap'd. 75¢
 Nickel Plated. 65¢

Tinnings' Snips—

Wrt. Hdw. Steel Blades. 20¢@20¢10¢
 Niagara Snips and Shears. 20¢@20¢
 Cast Handles, Laid with Steel. 40¢

Pruning Shears and Hook

Disston's Combined Pruning Hook and Saw. \$ doz \$18.00, 20¢@10¢
 Disston's Pruning Hook, \$ doz \$12.00, 20¢@10¢
 E. S. Lee & Co.'s Pruning Tools, 50¢@10¢70¢
 Pruning Shears, Henry's Pat. \$ doz \$3.50@4.00
 Henry's Pruning Shears, \$ doz \$4.25, 20¢@10¢

Wheeler, M. & C. Co., Combination, \$ doz \$12.00

Dunlap's Saw and Chisel, \$ doz \$8.50, 30¢
 J. Mallinson & Co., No. 1, \$5.25; No. 2, \$7.25
 P. S. & W. Co. 60¢
 Levin Pruner No. 1, \$15.00 \$ doz 40¢@3¢
 Levin Pruner No. 2, \$21.00 \$ doz 40¢@3¢

Tinnings' &c.—

Shears and Snips (P. S. & W.). 20¢@25¢
 Snips, J. Mallinson & Co. 33¢@3¢

Sheaves—**Sliding Door—**

M. W. Co., list July, 1888. 50¢@10¢60¢5¢
 R. & E., list Dec. 18, 1885. 55¢@20¢
 Corbin's list. 80¢@10¢25¢
 Patent Roller. 60¢@10¢25¢
 Patent Roller, Hatfield's. 75¢
 Russell's Anti-Friction, list Dec. 18, 1885. 60¢@25¢
 Moore's Anti-Friction. 50¢

Sliding Shutter—

R. & E., list Dec. 18, 1885. 60¢@10¢25¢
 Sargent's list. 70¢
 Reading list. 60¢@10¢10¢

Shells—

First quality 4, 8, 10 and 12 gauge. 25¢@10¢25¢
 First quality Rival, Club and Climax brands, 14, 16 and 20 gauge (\$7.50 list). 20¢@10¢25¢
 Prize. 40¢@25¢
 Star, Club, Rival and Climax Brands. 35¢@10¢25¢
 Smokeless brand, 12, 10, 16 gauge. 35¢@10¢25¢
 Trap brand, 12 and 10 gauge. 35¢@10¢25¢
 Selbold's Comb. Shot Shells. 15¢@25¢
 Brass Shot Shells, list quality. 60¢@25¢
 Brass Shot Shells, Club, Rival, Climax. 65¢@25¢

Shells, Loaded—

Standard list, July 19, 1890. 40¢@10¢10¢40¢@10¢10¢5¢
 7¢ cash, 10 days.

Ship Tools—

L. & I. J. White. 20¢@5

Shoes, Horse, Mule, &c.**Horse—**

Burden's, Perkins', Phoenix, Standard, Diamond State, Bryden's Boas and Crescent, at factory. \$4.00
 Bryden's Frog Pressure, at factory. \$5.00

Mule—

Add 1¢ keg to above prices.

Ox Wrought—

Ton lots. \$ doz 9¢
 1000 lb lots. \$ doz 9¢
 500 lb lots. \$ doz 10¢

Shot—

Drop, up to B, 25-m bag. \$1.40
 Drop, up to B, 6-m bag. 35¢
 Drop, B and larger, 25-m bag. 1.05
 Drop, B and larger, 5-m bag.40
 Buck and Chilled, 5-m bag. 1.65
 Buck and Chilled, 5-m bag. 1.65
 Dust Shot, 25-m bag. 2.00
 Dust Shot 5-m bag.45

Shovels and Spades

Snaps, Harness, &c.

Anchor (T. & S. Mfg. Co.)	60
Fitch's (Bristol)	50
Hutchins	10
Andrews	50
Sargent's Patent Guarded	70
German, new list	40
Covett	50
Covett, New Patent	50
Covett, New R. E.	50
Covett's Saddle Works' Triumph	35
John Prots Snaps	75
Kelley & Woolworth's Steel Harness	50

Snaths

Sythe	50
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Soldering Irons

See Irons, Soldering.

Spittoons, Cuspidors, &c.

Standard Fiberware	
Cuspidors, 3 1/2 inch, # doz., No. 5, \$3; No. 5X, \$9.	
Spittoons, Daisy, 8-inch, No. 1, 1; 10 and 11 inch, \$6.	

Spoke Shaves

See Shaves, Spoke.

Spoke Trimmers

See Trimmers, Spoke.

Spoons and Forks**Tinned Iron**

Basting, Cen. Stamp. Co.'s list	70
Solid Table and Tea, Cen. Stamp. Co.	70
Buffalo, S. S. & Co.	85

Silver Plated

4 months or 5% cash 30 days:	
Holmes & Edwards Silver Co.	50
No. 37 Mexican Silver	50
No. 30 Silver Metal	50
No. 24 German Silver	50
No. 50 Nickel Silver	50
No. 49 Nickel Silver	50
Wm. Rogers Mfg. Co.	50
Rogers Silver Metal	50
15% Rogers Silver	60
22% Rogers Nickel Silver	60
Rogers & Hamilton:	
Steel Goods	40
Cimeter, Flatware	40
Cimeter, Steel Goods	40
Crown Hamilton, Flatware and Cutlery	30
German Silver	60
Nickel Silver	50
Britannia	60
Boardman's Nickel Silver, list July 1, 1891	60
Boardman's Britannia Spoons, case lots	60

Miscellaneous

No. 37 Mexican Silver	50
No. 30 Silver Metal	50
No. 24 German Silver	50
No. 50 Nickel Silver	50
No. 49 Nickel Silver	50
Wm. Rogers Mfg. Co.	50
Rogers Silver Metal	50
15% Rogers Silver	60
22% Rogers Nickel Silver	60
Rogers & Hamilton:	
Steel Goods	40
Cimeter, Flatware	40
Cimeter, Steel Goods	40
Crown Hamilton, Flatware and Cutlery	30
German Silver	60
Nickel Silver	50
Britannia	60
Boardman's Nickel Silver, list July 1, 1891	60
Boardman's Britannia Spoons, case lots	60

Springs

Torrey's Rod, 39 in.	12
Warner's Rod, 1 1/2 in.	12
Gem (Coll), list April 19, 1888	20
Star (Coll), list April 19, 1888	20
Victor (Coll)	60
Champion (Coll)	60
Cowell's, No. 1, # doz \$15.00; No. 2, \$15.00	50
Rubber, complete, # doz \$4.50	50
Hercules	50
Phoenix	35

Marriage, Wagon, &c.

Elliptic, Concord, Platform and Half Scroll	60
Chas. Bolster Springs	25

Squares

Steel and Iron	80
Nickel-Plated	80
Try Square and T Bevels	60
Diston's Try Square and T Bevels	60
Winterbottom's Try and Miter	30
Starrett's Micrometer Caliper Squares	25
Avery's Flush Bevel Squares	40
Avery's Bevel Protractor	60

Squeezers

Blair's	25
Blair's "Climax"	25

Lemon

Porcelain Lined, No. 1	50
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Wood, No. 2	25
Wood, Common	25
Dunlap's Improved	25
Sammis, No. 1, \$5.00; No. 2, \$3.12	25
Jennings' Star	25
The Boss	25
Dean's, No. 1, # doz \$1.00; Queen, \$2.50	25
Little Giant	25
King	25
Hutchins Straight Flash	25
Silver & Co. Glass	25

Standard Fiber Ware

See Ware, Standard Fiber.

Staples

Barbed Blind, 1/4 in. and larger	75
Barbed Blind, 1/4 in.	75
Fence Staples, Galvanized	75
Fence Staples, Plain	75
Grand Crossing Tack Co.'s list	75

Staples

Blacksmith's	85
Waterford Goods	85
Butterfield's Goods	85
Lightning Screw Plate	85
Reece's New Screw Plates	85
Reversible Ratchet	85
Gardner	85
Green River	85

Staples

Morrill's, # doz, No. 1, \$10.00; No. 2, \$11.00	40
Hutchins	40
Weston's, No. 1, \$10.00; No. 2, \$9.25	40

Staples

Double Point	90
Wire Carpet Nails	50
Claw Handle Carpet	50
Bonnie Blue	50

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Stones, Grind-See Grindstones.**Scythe Stones**

Pike Mfg. Co., list April, 1892	85
Cleveland Stone Co., list Nov. 1892	85

Oil Stones, &c.

Pike Mfg. Co.	85
Hindstone No. 1, # D. 8	85
Sand Stone	85
Turkey Oil Stone, # 4 to 8	40
Turkey Slips	85
Lilly White Washita	85
Washita Stone, Extra	85
Washita Stone, No. 1	85
Washita Stone, No. 2	85
Lilly White Slips	85
Rosy Red Slips	85
Washita Slips, Extra	85
Washita Slips, No. 1	85
Arkansas Stone, No. 1, 3 to 5 1/2	5.80
Arkansas Stone, No. 1 1/2 to 3 in.	5.50
Lake Superior	13
Lake Superior Slips	13

Stove Polish

DECEMBER 6, 1893.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

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